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COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

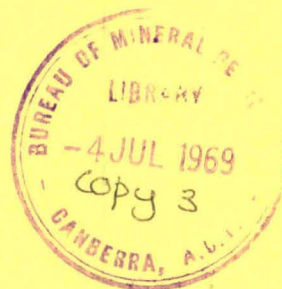
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Record No. 1969 / 78

Notes on Visit to Canada
and USA, 1969

by

L.W. Williams



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NOTES ON VISIT BY L.W. WILLIAMS TO CANADA AND U.S.A., 1969

Introduction

During the period 18th May to 10th June, 1969 visits were made to the following organisations:-

Canada

Department of Energy, Mines and Resources
Mineral Resources Branch
Energy Development Branch
Geological Survey of Canada

Department of Indian Affairs and Northern
Development
Resource and Economic Development Group

National Energy Board

Oil and Gas Conservation Board, Alberta.

U.S.A.

U.S. Department of Interior
Office of Oil and Gas
Oil Import Administration
Bureau of Mines

U.S. Department of State
Office of Fuels and Energy

Department of Conservation, State of Louisiana

Railroad Commission of Texas

Notes on discussions with the various organisations are attached.

Role of Federal Governments

The only formal control on imports or exports of crude oil which exists at present is in U.S.A. where imports are restricted. In Districts I-IV (east of the Rockies) the amount of crude oil to be imported is determined annually and is set at 12.2% of the expected production in those Districts for the year. In District V (west coast) the imports are set at the difference between the expected production and market demand.

In Canada a minimum price has been set for imported motor spirit to prevent dumping.

There is an agreement between U.S.A. and Canada which limits the amount of Canadian crude which can be exported to U.S.A. However I was told that the Canadian Government, at this time, has now power to limit exports and that the amount of crude being exported to U.S.A. was being controlled by voluntary company action. Later information I received indicated that the quota was being exceeded and that the Canadian Government looked like being forced into the position of having to formally restrict exports to U.S.A.

There are no restrictions on exports from U.S.A.

In neither Canada nor U.S.A. does the Federal Government attempt to control production from the individual states. I believe that this was done in U.S.A. many years ago but the system was challenged and found to be unconstitutional. Production from the various states is now determined by market demand.

Both Governments have divided their countries into two areas - oversupplied and undersupplied with indigenous crude - for economic reasons and treat them separately.

Role of State Governments

The various State bodies see their role primarily as one of preventing physical waste and the measures which have been adopted over the years have been aimed at achieving this objective. Another factor which has influenced their actions is the protection of the correlative rights of the many owners in each field.

In Texas, in particular, physical waste has been extended to economic waste and prevention of economic waste has been the justification for prorationing of production to market demand. This approach has been challenged in the courts but survived the challenges and is now accepted.

The Oil and Gas Conservation Board in Alberta has considered prorationing an essential feature in the protection of correlative rights.

None of the States with prorationing of crude oil have provision for maintaining a minimum level of reserves for use in that State. Alberta does have a requirement to maintain 30 years supply of gas before exports are permitted. Their reason for having the requirement for gas and not oil is that it is comparatively easy to move in supplies of crude oil, if necessary, but this is not so for gas if the source of supply is overseas.

It is only in recent years that the various States have amended their systems to prevent the drilling of wells with the sole purpose of increasing the allowable production from a field.

The administration of the two functions, conservation and prorationing to market demand, is completely interwoven in the departments visited. It is not possible to consider one without the other in reviewing their systems.

Types of Prorationing

The basis being used for prorationing is either reserves (Alberta) or depth of wells (Texas and Louisiana). In all cases there is provision for a minimum economic allowable. In Alberta the pool allowable is determined first and this is divided into well allowables whereas in the other States the well allowable is determined directly. Permitted production in any month is prescribed as a percentage of the allowable.

Unitisation (i.e. production of a pool as a unit) has been encouraged for many years and, more recently, provision has been made to encourage the widest possible spacing of wells which is in accordance with good engineering practice.

Alberta - the pool allowable is determined from the average of the ultimate and remaining reserves. Only reserves which are "reasonably proved" and "economically recoverable" are considered. The Board does not normally calculate reserves but relies on the reserve figure claimed by one company being challenged at a public hearing by other companies if it is questionable. This is possible because data from production wells are publicly available.

Each well has a "floor allowance" (minimum economic allowance) and, if this is greater than the well allowable determined from the pool allowable, the floor allowance is used and consequently the pool allowable would be affected. The floor allowance is now designed to allow recovery of completion and operating costs during the life of the well. Previously it also covered drilling costs, but this encouraged unnecessary drilling.

Louisiana - Well allowables are determined from a depth bracket formula which takes into account the average cost of drilling to various depths. Separate formulae apply to onshore, intermediate (bayou) and offshore areas. An "acreage factor" has now been introduced in an attempt to encourage wider spacing of production wells.

However a great number of wells are on special allowables either because they are unable to produce the normally allocated quota (deficient wells) or because the allowable has been increased for engineering reasons.

Texas - Allowables are determined for each well according to the depth of the well. In this State the table is known as a depth yardstick. The 1947 yardstick was based on 20 acre spacing and the cost of drilling and was responsible for the drilling of many unnecessary wells. The yardstick was revised in 1965 and made the allowables much more dependent on the acreage assigned to each well. There is a separate yardstick for offshore.

This State also has a "Discovery allowable Schedule" which provides for a daily well allowable on new fields which is exempt from percentage proration for 24 months or until the eleventh well is completed in the reservoir.

Again many wells must be given special allowables for various reasons. The most common is a "maximum efficient rate of production" (MER) which is sometimes necessary to ensure optimum recovery from the reservoir, particularly if secondary recovery methods are used.

Other Matters

Condensate - condensate is not prorationed in any of the areas. The total production of condensate is subtracted from the total market demand before prorationing. There is very little recycling carried out in either Louisiana or Texas and the condensate is primarily liquids produced from gas wells and liquids produced from casing head gas from oil

wells. Production from gas wells is controlled and there is a maximum permissible gas/oil ratio for oil wells so that condensate production is controlled. Alberta recognises that condensate will reduce the demand for medium and light crudes but is prepared to accept the situation provided that natural gas liquids production from processing of natural gas for sale does not exceed 10%, and natural gas liquids from recycling does not exceed 5%, of total crude oil market demand.

Interstate Oil Compact Commission - this body was given Congressional authorisation in 1935 and now has 30 States as members. Its prime purpose is to encourage a uniform approach between the States "to conserve oil and gas by the prevention of physical waste thereof from any cause". It has various committees - Legal, Engineering, Regulatory Practices etc. which produce reports which are made generally available. It is financed by voluntary contributions from the various member states.

It is widely recognised as being a useful and effective body. It was initially a two-year agreement but this has been extended by Congress for two-year periods until 1943 and for four-year periods since then.

One claim for it is that "it has been an effective block against federal encroachment on state sovereignty".

Computers - extensive use of computers is being made throughout the industry in reservoir studies, and government bodies, Alberta in particular, recognise the value of the studies. They accept model results in determining some of their procedures.

McCord and Associates in Dallas, Texas are among the leaders in the field and have a good range of programmes available for hire or sale.

The Australian Situation

Any scheme introduced in Australia to provide a share of the Australian market to each producer should have the following features:

- (a) encourage the production of reserves to the maximum economic extent in accordance with good engineering practice
- (b) do not discourage exploration
- (c) do not increase cost of production
- (d) treat all producers equitably
- (e) permit simple administration

In addition, it may be desirable to differentiate between types of crude.

It appears desirable to base quotas on the largest possible unit i.e. on a pool rather than on a well.

The various schemes based on wells do not appear desirable because:

- (a) the individual allowables would eventually be summed to get a pool allowable
- (b) there always appears to be, in practice, a great number of special cases requiring individual treatment
- (c) well performance has to be checked regularly - preferably every 2 months
- (d) an acceptable depth formula must be developed

Reserves appears to be a more desirable basis because:

- (a) it avoids the need to consider individual well performance
- (b) reserve estimates determined annually would probably be sufficient
- (c) it would be comparatively simple to determine them on a uniform basis throughout Australia.
- (d) encourages proving of reserves

The type of reserves to be used in the calculation would need definition. Perhaps the average of the ultimate and remaining economically recoverable reserves would be appropriate.

However it must be remembered that the economically recoverable reserves depend on the manner in which a field is developed. This is subject to State approval and may not be treated in precisely the same manner in each State. It may become necessary for the Commonwealth to make their own estimate of reserves, in which case the use of computer models is strongly recommended for consideration.

Prevention of waste of natural resources is an essential consideration in any country and is one factor which must be borne in mind when any system of prorationing is being considered.

It may be necessary to have a minimum economic allowable for each well to ensure maximum recovery. However this should be considered after the pool allowable is determined and should not take into account the cost of drilling the well but only completion and operating costs.

DEPARTMENT OF ENERGY MINES AND RESOURCES, OTTAWA

I had brief discussions with Dr. Isbister (Deputy Minister) and Mr. McNabb (Assistant Deputy Minister, Energy Development) of the Department but my main discussions were with Mr. Toombs (Gas and Oil Adviser, Energy Development Branch), Mr. Bob Simpson (Acting Head, Energy Minerals Section, Commodity Division, Mineral Resources Branch) and Dr. Don Crosby (Chief, Resource Administration Division, Mineral Resources Branch). In addition Mr. Keith Back (Director, Mineral Resources Branch) explained the functions of the various Branches.

From Toombs I got a very good description of what is happening in practice in Canada. He is involved, along with N.E.B. representatives, in developing Canada's submission to the task force on U.S. imports.

His only real objection to the Alberta (or any) system of prorationing is that it encourages overdrilling. He agrees with reserves as a good basis for prorationing but considers that well productivity should also be a factor so that a "better" field would get a bigger quota. He had nothing constructive to offer on the basis of determining reserves or the productivity of offshore wells.

The Canadian Government has provision in one Act that they could legislate to control exports to maintain a minimum reserve of crude oil in Canada but, to date, has not contemplated doing so. There is no limitation on exports except in so far as it is forced on them by the U.S.-Canada agreement on limitation of Canadian exports to the U.S.

Toombs realises that developments in the Pordhoe Bay area, possible discoveries off the east coast of Canada or increased production in any additional province could force the Government into attempting to introduce a Federal prorationing system. Crosby told me that already a preliminary move has been made by Alberta to have the Federal Government take over prorationing, at least as far as apportioning markets between Provinces.

Apart from the Federal Territories which they administer and from which they will get information, the Federal Government relies on Provincial Government estimates, or Canadian Petroleum Association figures, for the oil reserves in the country.

The Department of Indian Affairs and Northern Territories administers the area north of 60° latitude and Department of Energy Mines and Resources (Crosby's group) administers the offshore areas. These areas will both be administered under the provisions of the same Act, which has recently been passed, when this is extended to the offshore areas as a result of a very recent Government decision.

This Act definitely gives the Federal Government the right to prorate in these areas and Crosby expects to have to do so if offshore production is found. But this would probably only be done after the N.E.B. allots quotas to the various areas.

It is interesting to note that Canada will specifically include the "continental shelf" in the above Act and that they have taken the view, publicly stated, that they consider that the shelf extends to the bottom of the continental slope. They have, in fact, granted exploration licences out to water depths of 10,000 feet.

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(A paper recommended by Crosby for reading is one presented by Hallis Hedberg at this years A.A.P.G. meeting).

I discussed comparisons between Alberta and Saskatchewan with Simpson. It is primarily because of Saskatchewan's lower production and easier access to the U.S. Midwest market that it is not prorated. However buyers still have to make monthly bids for production, but there is no public hearing and buyers (companies) can get their own crude.

NATIONAL ENERGY BOARD, OTTAWA

The National Energy Board looks after electricity, oil and gas and pipelines.

I find it difficult to differentiate between the functions of sections of the National Energy Board and Department of Energy, Mines and Resources as regards oil policy. (~~copies of organisation charts attached~~). Both the National Oil Policy Unit of N.E.B. and the Oil and Gas Adviser of D.E.M. & R claim that they play the principal role but in practice it appears that they are both represented on committees which consider policy. Theoretically the Minister is supposed to co-ordinate the various views.

The National Oil Policy is basically that in the area west of the Ottawa Valley all crude requirements will be supplied by Canadian crudes and all products marketed will be refined in Canada. The area east of the Ottawa Valley is reserved for foreign crudes (mainly Venezuelan).

This policy was assisted and partly implemented by the Federal Government refusing to authorise the construction of a pipeline from the western area to Montreal.

There is an agreement between Canada and the United States (only recently disclosed) that Canada will restrict exports to the U.S.A to specified maximum amounts which increase annually. This export market is supplied by Alberta and Saskatchewan.

These exports quotas have been achieved to date by voluntary co-operation from companies. However Canada is under increasing pressure, particularly from the Chicago area, to export more crude and the voluntary system is in danger of breaking down. The Board does not appear to have any clear idea of what they will do if this happens.

The permissible annual increase in export quotas to U.S. is approximately the same as the increase in demand in U.S. Districts I-IV and, in fact, Canada is taking this additional market. It must be remembered that Canada is in a preferred position as far as imports of crude to U.S. is concerned. Provided that it is transported overland, the crude imported from Canada comes from "off the top" of the total U.S. import quota.

The main reason for the pressure for increased exports is that, in the Chicago area, Canadian crude is about 50 cents a barrel cheaper than U.S. crude. This is in spite of "Cap-line", and its extension, which brings Louisiana crude north.

However the Canadian crude would be more expensive in the Ottawa-Montreal area than Venezuelan crude. So that Canada is benefitting from importing cheap crude and exporting more expensive crude.

There is no restriction on imports of crude or products except for a minimum valuation on motor spirit of 10½ cents per gallon - for motor spirit a lower purchase price than this would be taken as an indication of dumping. The Board admits that it is an extremely easy matter to get around this!!

The Board is aware that various factors could affect Canada's import-export position, but appears to be taking a wait-and-see attitude. Such factors include:

- (a) the Prudhoe Bay discoveries which will almost certainly result in a trans-Alaska pipe-line with crude then being shipped to the U.S. West Coast. This would reduce or eliminate Canadian exports to the Puget Sound area
- (b) possible discoveries in the Arctic territories or off the east coast of Canada which would result in greatly increased Canadian production but no increase in markets. Would Federal prorationing be necessary?

They are quite self-satisfied with the way in which voluntary restrictions have been successful to date and seem to be sitting back hoping that the companies will voluntarily adopt some further restrictions in the future to overcome the difficulties which the Government may face.

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My discussions were with Mr. Vern Millard, a member of the Board, in the absence of Dr. Govier.

A public hearing was held in 1963 to consider the prorationing scheme which was then in operation and to hear company submissions and evidence on changes which were considered desirable. As a result of the hearing and subsequent consideration of the submissions, evidence, questions and answers the Board decided their new policy. A report of the hearing, together with the Board's decision, has been published and Mr. Millard will forward copies when it is reprinted (expected in June).

Transition to the new system was completed in May, 1969.

I discussed the past and present systems briefly and the reasons for the changes in more detail. Company recommendations, with reasons, and the Board's decision, with reasons, are set out in fair detail in the Report mentioned above.

Briefly the present procedure for prorationing, subject always to good engineering and conservation practice, is:-

1. Determine market demand
2. Determine provincial allowable
3. Determine pool allowable
4. Determine well allowable

1. The market demand is determined from returns submitted by prospective buyers who state their requirements for the next month, and estimates for the following two months, for various types of crude. These are considered at a public hearing. (samples, forms and returns being forwarded to B.M.R.).

The buyers requirements are set out under the categories:

Heavy crude

medium crude

light crude

condensate (or pentane plus)

synthetic oil - from oil sands.

Only medium and light crudes are prorationed because these are the only two categories in which potential production exceeds demand.

An important point which was brought out in answer to my specific questions was that the market demand includes all exports from Alberta. The Act makes no provision for special market arrangements. (Copy of Act and Regulation to be forwarded to B.M.R.). That is to say that no company can make special arrangements for the ~~rate~~ sale of its crude

production from Alberta. Any additional market is prorated between all Alberta production. This is the general case, because although all exports at present are to U.S.A., the same provision under the Act would apply even if a market were found in, for instance, Japan. This is very unlikely because of prices. However if the possibility of export outside North America arose the Board would consider amending the Act to permit production above the prorated quota for this purpose.

Again it must be remembered that this applies only to Alberta (which has 85% of Canada's oil reserves). Other Provinces with oil production, e.g. Saskatchewan, British Columbia etc., do not have prorating.

Also, the market demand is influenced by price. There is no price fixing in Alberta as such. The price is determined by competitive considerations, particularly the price of U.S. crude.

2. The Provincial allowable is determined for the prorated medium and light crudes by subtracting the market demand for heavy crudes, condensate (or pentane plus) and synthetic oil from the total market demand.

The Board realises that condensate or pentane plus (see definitions in Act) will reduce the demand for medium and, particularly light crudes. They draw a distinction between this product being produced from drying of natural gas produced for sale and from the recycling of wet natural gas reservoirs. They are prepared to accept that the overall position will not be affected too seriously if natural gas liquids production from processing of natural gas for sale does not exceed 10%, and natural gas liquids from recycling does not exceed 5%, of total crude oil market demand. This is their present position, but if natural gas liquid production increases they consider that they will have to think again.

3. The pool allowable is based primarily on the average of the ultimate and remaining reserves of the pool. Although not defined in the Act, the Board would consider only reserves which are "reasonably proved" and which are "economically recoverable". I could not get a definition of these terms but a distinction was made between old pools (i.e. in production before the new scheme) and new pools.

The reason for using an average of the ultimate and remaining reserves was that the Board appreciated that there were arguments both for and against both proposals and, being unable to decide in favour of one or the other, decided to compromise. In fact they have achieved, in a modified form, the advantages of both and have minimised the disadvantages.

4. I did not pursue well allowables in any detail because this is beyond the scope of any scheme which we may introduce. However the well allowable could affect the pool allowable in that there is a minimum allowance for each well. Under the new scheme this allowable is considered after the distribution is made on the basis of reserves and action is required only if the well allowable is less than the minimum allowance.

Under the previous system in Alberta the minimum allowance was sufficiently high to allow recovery of drilling, completion and operating costs. This led to the drilling of wells, which were unnecessary from an engineering point of view, with the sole purpose of obtaining an

allowable. The cost of this extra drilling led to an increase in cost of the crude. The Board realised this disadvantage in the scheme and now the minimum allowance, the "floor allowance", is only high enough to cover completion and operating costs and not drilling costs. This results in less wells being drilled in new fields and encourages exploration for new major accumulations rather than drilling what would be marginal wells in the vicinity of existing production.

The Board has also allowed bigger areas to be allotted to wells for prorationing purposes with the result that 1600 wells which were previously producing have now been shut in i.e. at least 1600 production wells were drilled unnecessarily under the old scheme.

General

The scheme is devised with the primary aims of maximising production from fields and of eliminating any unnecessary expenditure on development.

The floor allowance helps to prevent premature abandonment of fields.

The introduction of secondary recovery methods early in the life of a field is encouraged because this would increase the recoverable reserves and hence the allowance for the pool.

The Act in Alberta provides that 30 years reserves of gas must be available before any gas may be exported but has no similar provision for oil. In theory at least free export of oil is allowed as this is considered to be an encouragement to exploration.

The practical difficulties which are being encountered are primarily related to the division of pool allowables into well allowables and occur when there is multiple ownership of the pool i.e. when a pool occurs under areas held by different companies or partnerships.

The following publications are being forwarded to B.M.R.

3* copies of Report and Decision on Review of
Prorationing (July 1964)

1 Report on Reserves

1 Report on Operations of Oil and Gas Conservation
Board

1 Copy of Act and Regulations

1 Sample of return for market demand

U.S. DEPARTMENT OF INTERIOR

Office of Oil and Gas

This office is basically responsible for policy and emergency planning in the Department.

The Federal Government is in favour of prorationing as applied by the States and has never interfered with State production or their prorationing programmes. In fact it does not have the power to do so.

There are now only two States - Texas and Louisiana - which have prorationing. It was recently lifted in Oklahoma because the State did not produce its expected allowable.

The Government at present restricts imports (see Oil Import Administration) but this has been found to be very costly and the policy is at present under review as a result of a decision by Congress.

John Ricca (Acting Director) favours a system of control of production which would result in the least possible interference or control by Government. In fact his attitude is "leave them alone". This can only be taken as a personal attitude as far as Government is concerned.

Oil Import Administration

Spoke to J.J. Simmons (Acting Administrator) and T. Snedeker (Assistant Administrator).

This is purely an administrative group and does not determine or recommend policy.

In Districts I-IV (East of the Rockies) an estimate is made for the production for the next 12 months. The import allowable is determined as 12.2% of this. The estimated overland imports (from Canada and New Mexico) are deducted from this and the remainder is allocated between refineries - 85% on basis of estimated throughput and the remaining 15% mainly to give assistance to small refineries.

In District V (West Coast) the import allowable is determined as the difference between the estimated production and demand.

"Import tickets" are worth \$1.25 per bbl in Districts I-IV and 75 cents in District V.

Appeals against quotas may be made only on the grounds of hardship or error and are investigated by the Oil Imports Appeal Board.

(Have copies of Regulation and Proclamation).

Bureau of Mines

Mr. W. Elliott (Acting Senior Staff Specialist for Petroleum) spoke enthusiastically about the Interstate Oil Compact Commission. In his opinion a similar body is essential in any country with a Federal-State arrangement similar to the U.S.

(I have pamphlets describing the organisation, history functions etc.).

Briefly, it is a body set-up to avoid waste and has an executive and several technical committees. The Federal Government sends an observer to meetings. It will undertake projects at the request of the Federal Government and is in the process of completing a paper which will make recommendations on definitions etc. to ensure uniformity throughout the country. (Elliott will send copy in July).

Elliott can not see any prorationing system being equitable unless there is provision for economic allowable. In his opinion this is necessary to take account of high costs because of remote areas, offshore, small field etc.

U.S. DEPARTMENT OF STATE, WASHINGTON

Office of Fuels and Energy - Mr. J. Akins, Director.

This is a small group (4) which watches the world petroleum situation to see how it affects their international relationships.

They are very deeply involved in the "task force" which has been set up by Congress to study their Mandatory Oil Import Programme. A comprehensive set of questions has been set out to be answered (see copy attached). This enquiry has been initiated because of the very high cost of their present policies.

Akins is convinced that a revision of their policies will be made which will result in cheaper energy in the U.S. However there will be a consequent increase in their import bill and the final decision may well be a compromise between these two factors.

One estimate of the effect of increasing imports and abandoning prorationing is that domestic production would fall by 3 million bpd within the next 5 years. (This, of course, ignores any effect of Alaskan crude). The reason for this is that the drop in price for domestic crude would force many wells to be closed in (mainly "stripper" wells, defined as producing less than 10 bpd).

Another factor causing concern to this group is that productive capacity in Louisiana and Texas may be overestimated. This was certainly the case in Oklahoma when permitted production was increased from 75% to 90% of allowable. Production should have increased by 130,000 bpd but in fact only increased by 2,000 bpd.

It must also be remembered that productive capacity does not mean much unless there is corresponding pipe-line capacity. This is commonly not the case.

Everyone seems to agree that there are large reserves in the Prudhoe Bay area but the Government is not getting the information on the wells and does not know what the reserves are, even to within a degree of magnitude.

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DEPARTMENT OF CONSERVATION - LOUISIANA

Spoke briefly with Mr. Menefee and then with Tom Winfiele and Carlton Hudson.

The form of the Louisiana prorationing was determined primarily by the mineral rights position which leaves the rights in the hands of the landowners. Because of this it was not considered practical to determine a pool allowable because of the number of individual owners and the difficulty in dividing the allowable among them. This has been amended somewhat more recently with the introduction of unitisation.

The method adopted was to determine an allowable for each well based on a depth-bracket formula. This takes into account the average cost of drilling to various depths and also the greater cost of drilling offshore.

The monthly procedure is

- (1) ask purchasers to furnish, by fields, the amount of crude that they would like to purchase during the next month (and the amount which they actually purchased during the previous month).
- (2) these returns, known as nominations, are considered at a public hearing to determine the market demand.
- (3) the amount of production from deficient wells is subtracted from the market demand (A deficient well is one that cannot produce up to its allowable as shown by testing which is required every 2 months.)
- (4) the remainder of the market demand is allocated between other wells. The basis is a percentage of the allowable determined from the depth bracket formula (For May, 1969 it was 45%).

(It is possible for the allowable to be increased to permit efficient operation in the case of secondary recovery methods being introduced and for other special reasons).

I see disadvantages of the method as being

- (a) drilling only to obtain allowables, and
- (b) (from our point of view) an unnecessary amount of work in determining allowables

The officers I spoke to claim that the additional drilling is not waste as you will only find oil if you drill and that their system encourages drilling. While this is partly true, the additional drilling is around existing fields and will not add greatly to reserves. What is needed is more wildcat exploration. Also, if more wells than are necessary are drilled to produce a field, the cost of the oil must be higher than is necessary.

The officers agreed that if they were introducing a method of allocation for the first time in an area, and if they were not facing the problem of multiple ownership of field, they would prefer as simple a system as possible and that reserves appeared to be the most desirable basis.

However to determine what to use as reserves is a much more difficult problem. Ultimate or remaining (Alberta uses the mean) is one question and a decision is still needed whether "proved and probable" should be accepted or whether they should be "available" i.e. wells completed for production.

The officers appeared to have a preference for "available" but, although I agree that this may be desirable if we reach the stage of large exports, I think that it may result in unnecessary amounts of capital being invested in completing wells much earlier than is necessary or economically desirable.

Perhaps it would be desirable if we assigned a given area to each well drilled, depending on pressure and permeability, for the purpose of determining interim reserves. This would then be the basis of allocation until such time as sufficient production history was available to determine the reserves.

Staff

The Department has a staff of 10 geologists and 19 engineers to look after conservation and prorationing in the State. They make no effort to determine reserves and generally assume that the allowable is less than the most efficient rate of production.

The engineers must be specialists in reservoir engineering and attend courses, whenever they are available, to increase their skills, particularly as regards computer applications.

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RAILROAD COMMISSION OF TEXAS

I spoke with Bob Harris (Assistant Chief Engineer of Oil and Gas Division) and Fred Young (Legal Counsel).

The history of the Commission and the various changes in their rules are set out in papers which I was given.

Their whole system is based on prevention of waste and the preservation of correlative rights. Even proration to market demand is rationalised as being prevention of economic waste.

In 1947 they introduced a depth yard-stick to determine the allowable for each well. This was based on a 20 acre spacing and the cost of drilling to various depths. It was responsible for the drilling of unnecessary wells to get an allowable and a new yardstick was introduced in 1965 (for fields discovered after 1st January, 1965) which made the allowable more dependent on area than the previous one, as well as on depth.

The Commission realises that this system is not completely satisfactory and is proud of the fact that they are flexible. For instance many fields have their allowables set on M.E.R.'s (most efficient rate of production) which may be higher or lower than the yardstick allowables. M.E.R.'s are used for engineering reasons only e.g. if a fast waterflood is necessary to maximise ultimate recovery, the allowable may be increased above yardstick allowable. Also there is a special yardstick for offshore wells because of the higher costs.

They believe in discussing any proposed change in rules with industry before taking any action. An interesting feature is that the Commission nominates the members of the industry committee. Following this consideration a public hearing must be held before any change in the rules.

They have no special rules about prorationing condensate and in fact allow it free access to market before dividing up the market demand. They consider condensate as

- (a) all liquids from wells classified as gas wells
- (b) liquids produced from casing head gas from oil wells

But gas production is strictly controlled and they have a maximum permissible gas/oil ratio from oil wells. Their main concern is always prevention of waste and practically any process which is in accordance with good conservation practice is permitted.

There is no attempt by State or Federal Governments to apportion the total U.S. market between States. The market demand for crude from any State is determined solely by commercial competition.

Furthermore Texas makes no attempt to discriminate between the various types of crude. Even though, for instance, heavy crude may be in short supply they will not exempt it from prorationing. The reason is that it may be cheaper than higher gravity crudes but is capable of being processed to give a similar range of products and thus compete with the market available to the lighter crudes.

Security of supply has never been a factor taken into account in their scheme.

The determination of maximum amount to be produced in any month is done in a similar way to Louisiana.

- (a) market demand for Texas crude is determined from figures supplied by U.S. Bureau and from bids submitted by purchasers,
- (b) a check is kept on amount stored above ground in Districts I-IV,
- (c) from these factors the production for the ensuing month is determined,
- (d) marginal well and condensate production is subtracted from the total figure and then the percentage of the allowable for other wells is determined (63.5% for June).

Texas is having great difficulty in estimating what production will be achieved for various percentages of allowable. For several months production has fallen far short of estimates and the percentage allowable is increasing rapidly. The reason is that, as the percentage increases, fewer and fewer wells are able to make their permitted production. This means that the allowables determined from the yardstick are higher than the productivity of many wells. To get to a realistic figure the Commission would need to insist on testing of every well to determine a 100% allowable. This is difficult because many wells are being pumped and the pump capacity, which determines production, is no larger than necessary to produce what the owner expects his permissible rate to be.