Pollution Control and Oilfield Brine Disposal

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State regulation of the petroleum industry has been administered since 1901 by the Texas Railroad Commission under sound conservation statutes which are based on fundamental engineering principles. The fact that many other states of this nation, and foreign countries as well, have patterned their standards from our Commission is evidence of its worth. The leadership exercised by the Commission has undoubtedly promoted the healthy growth of the oil and gas industry both in Texas and throughout the Nation, and has protected the role of the states as the primary authority in oil and gas regulation. Long range conservation practices instituted on Commission orders have helped to maximize the economic benefits from Texas' rich heritage of natural resources.

By statutory authority the Texas Railroad Commission has been granted rather broad discretion in the regulation of the oil and gas industry, perhaps in recognition of the volatile and technically complicated nature of the industry's operations. However, regulation has been geared to prevention of waste, with due regard to protection of correlative rights. Those practices in drilling and production of hydrocarbons which result in increased ultimate recovery are definitely encouraged.

Regulation for regulation's sake is obviously detrimental to any society. Reasonable, prudent and judicial action in solving the many problems inherent in regulatory work requires first an understanding of the problem, its effect upon industry, royalty and mineral interests; and most important, the general welfare of the State and Nation, which in the final analysis depends upon the issuance of a rule or regulation designed to solve that problem which is consistent with the law and practical in its application. The final essential of reasonable regulation is that it be enforceable.

In the early days of exploration and production, there was little awareness of the potential problems which were developing in oil and gas producing areas. This lack of awareness was the result of the limited technology in the early days of oil production, and the little emphasis on water needs, water conservation and water development. Some of the problems which were later to plague the Commission and the petroleum industry had not made themselves apparent, and time has compounded their gravity. Only in recent years (since 1935) has the significance of the problems been widely recognized; consequently, multiphase programs have been instigated, including the avoidance of future contamination, correction of present improper practices, and remedial action regarding pollution from previous oil and gas activities. Both the State Legislature and the Commission, "each being responsible to the electorate," have underwritten funds, manpower and administrative policy for carrying out these programs.

More than eight million barrels of salt water are produced daily incident to the production of oil or gas in Texas; in addition, there are many salt water producing formations encountered behind casing of wells but not productive of hydrocarbons which have tremendous contaminating capabilities. But through its broad authorization and through specific legislation, the Railroad Commission of Texas either bears or shares the responsibility for preventing, eliminating, abating or remedying the pollution or contamination of fresh water supplies, either surface or subsurface, by brines, mineralized water, or hydrocarbons, encountered, produced, or released in conjunction with the exploration for and production of the hydrocarbon resources of the State of Texas. In broad categories, this authorization involves:

1. Protection of fresh water during the drilling of exploratory wells
2. Protection of fresh water during production of oil or gas wells
3. Protection of fresh water in either exploratory, "dry holes," or "plugged and abandoned" wells.

The exercise of these responsibilities is made under general statutory authority, statewide rules or special orders.

On January 1, 1969, Statewide Rule 8 (C), commonly known as the Statewide No-Pit Order, went into effect as one of a series of regulatory changes made over a period of several years directed toward the goal of eliminating oilfield brines and mineralized waters as contaminants of fresh water resources of the State.

There should have been nothing surprising in this rule; it was announced and published more than a year before its effective date, and in many respects was simply the statewide application of regulations that had been previously adopted for field and countywide areas throughout the State.

Nevertheless, there have been, and in the future probably will be marked changes in the general application of the rules and statutes now in effect, with particular emphasis on your planning for future operations, both with present production and additional exploration.

We have entered a new phase of pollution abatement and control; one which makes pollution control an integral part of exploration and production, and marks an end to the game of "catch up", which has engaged our major attention for several years. Based on the excellent cooperation we have received from the industry generally in the "catch up" phase, we anticipate no difficulty with this control program, so long as the operators understand what it is and how it applies to them.

The emphasis of change begins with the filing of the application to drill, because since the Amendment in 1965 of Article 6005 to the Texas Civil Statutes, each operator at the time he starts a well, assumes the responsibility of plugging that well in accordance with Commission requirements, and under some circumstances he may be held responsible even though he has sold or otherwise disposed of the well.

Of course, the operator has always had this obligation; but the control program of recent years has served to emphasize it, and has caused some operators to take a much closer look at leases being sold for "salvage" to be sure that the purchaser can and will comply with the plugging regulations knowing that the sale may not terminate the liability.

Further changes are noted in the preparation of the drillsite, and in the completion procedures of wells. One of the considerations now is the availability of salt water disposal facilities, and of salt water haulers to move the brines to a disposal point. Rule 8, as amended, places the initial responsibility of the disposition of oilfield brines and mineralized waters on the operator. He can't use a pit, he can't discharge into a surface drainage water course, dry creek, flowing creek, or river without having received special permission from the Commission, and he can't dispose of brines and mineralized waters through off-lease facilities until the method of disposition has been approved by the Commission.

No longer does the initial drillsite preparation contract include the digging of a salt water pit. The only pit permitted now without special exception is a burning pit used exclusively for the burning of tank bottom waste accumulation, and such accumulation does not include brine or mineralized waters. No size is specified for the "burn pits", but they are expected to be no larger than necessary; and if called on to do so, any prudent operator should be able to reasonably show the necessity for the size of such pits used.

In providing for the burn pits, it was assumed that the material put into the pits would burn or at least be burnable and there is no way that salt water can meet the burn test.

As with all Commission rules, Rule 8 (C) provides for the granting of exceptions, but the essential difference in administration is that under the rule now the operator must prove his need and justification for the exception requested, where before it was the burden of the Commission or some complainant to show that the practice being used was harmful.

Over the years, we have learned which procedures lead to pollution, contamination, and damage to the rights of the landowners and to the public generally. The lesson has been expensive to the taxpayers and to the operators through the excessive costs of correcting bad situations. The present program of the Commission is designed to prevent excessive expenditures in the future, and by including it in the initial phases of oil and gas operations it can be carried out without undue hardship on anyone.

The Commission has tightened up on re-

quirements as to the type of completion that will be acceptable on wells used for injection service. These include adequate casing and cementing procedures for the protection of the deepest fresh water sands. Of course, the production string of casing must be cemented with sufficient cement to fill the annular space back of the casing to at least 600 feet above the shoe. To complete the ideal injection program for the well, the injection of fluids would be through tubing on a packer, set immediately above the injection zone with pressure gauges on the tubing, casing and bradenhead.

The Commission has also tightened up requirements for casing programs, cementing and plugging procedures and has taken other steps necessary for the protection of fresh water bearing strata. Many of the problems facing the Commission and the oil industry today are due to the large number of wells which were drilled without modern technology and were not properly cased and cemented to protect all surface and subsurface waters.

As water use has multiplied, it has become evident that our supplies of water from all sources are ample only within the framework of certain rigid conditions, and important among these conditions is that all reasonable treatment and handling of waste water discharges be carried out to maintain water quality and limit or control pollution.

Not only has the use of water grown by leaps and bounds, but the variety of uses has multiplied. Water quality standards imposed by this multiplicity of uses are high, and industrial and municipal growth are dependent on the availability of good quality sources of supply.

In Texas, water is obtained from 23 river basins and intervening coastal areas, and seven major aquifers underlying about 65 per cent of the State. Additional important supplies of water are obtained from minor aquifers in local areas. Quality of water in these streams and subsurface aquifers ranges within fairly wide limits, and changes in quality of either ground or surface water in a local area potentially affect the entire water body involved.

On May 1, 1969, the Commission adopted Special Order No. 20-59,200 amending the general conservation rules and regulations of Statewide application by additional and more stringent regulations of drilling and production operations in State waters. This rule has particular bearing on the drilling, completion and operation of wells in Texas offshore waters, with further regard to prevention of pollution of the water of the Gulf of Mexico, as well as Adjacent Estuarine Zones (Bays, Inlets, and Estuaries). On October 1, 1970, Statewide Rule 8 (D) was amended to include lakes, rivers, and streams within the State of Texas.

The new regulations apply primarily to offshore drilling in the Gulf of Mexico but apply to the inland bays and estuaries as well as lakes, rivers and streams for pollution control. The rules specifically make the operators responsible for cleaning up, at their own expense, any oil spillage or other pollution in coastal waters.

In oil company operations both offshore and in bays, lakes, rivers, streams, and estuaries there are two possible sources of contamination and pollution. One is during the drilling operations of a well and the other is in the production operations after the well has been completed.

Rules require that all deck areas on drilling platforms, barges, workover units and associated equipment both floating and stationary which are subject to contamination, to be either curbed or diverted by drain to a collecting tank, sump or enclosed drilling slot in which the contaminent will be treated and disposed of without causing hazard or pollution; or else drip pans or their equivalent, must be placed under any equipment which might be considered a source from which pollutants may escape into surrounding water.

Additional blowout prevention equipment is provided for and periodic inspections on all tubular goods and equipment are required to insure that no malfunctions occur which could result in escaped oil or gas. During testing operations on a new well all gas is burned and all condensate and oil are caught in tankage and taken to shore.

All wells are equipped with surface safety valves and downhole safety chokes which would prevent escaping gas in a possible catastrophe such as hurricane or collision with any seagoing vessel. All of these producing facilities are treated for corrosion prevention and are periodically inspected so that replacements and repairs may be made to prevent failure and possible abrasion by exterior forces. Elaborate skimming facilities are required by the Commission in order to separate oil, gas

and condensate from produced water.

All gathering pipelines designed to transport oil, gas, condensate or other oilfield liquids from a well or platform to a point of sale to a purchaser are required to be equipped with automatically controlled shut-off valves at critical points in the pipeline system and other safety equipment must be in full working order as a safeguard against spillage from pipeline ruptures.

In drafting and enforcing these rules there has been mutual cooperation between the Railroad Commission, the General Land Office, the Parks and Wildlife Department and the Corps of Army Engineers. With this informal but effective arrangement, we have never had a major oil spill or leak in the waters adjoining Texas, and the minor leaks which have occurred have been quickly corrected.

The Commission has also adopted a new policy with regard to temporarily abandoned wells. On December 15, 1970 Mr. Arthur H. Barbeck, Chief Engineer of the Oil and Gas Division, issued a memo to all operators as follows:

1. Exceptions to Statewide Rule 14 (B) (2) may be granted by the Commission's District Office for not more than 12 months upon receipt of a properly supported request from the operator of the well.
2. Renewals to Exceptions to Statewide Rule 14 (B) (2) beyond the 12-month period may be granted only by the Commission. Requests for extensions may be processed administratively or may be set for public hearing. (Any renewals requested after December 31, 1970 for wells which have been temporarily abandoned for as much as 12 months will fall in this category.)
3. No Exception to Statewide Rule 14 (B) (2) will be necessary on incapable completions in multiply completed wells as long as one or more completion is being produced.
4. No Exception to Statewide Rule 14 (B) (2) will be necessary for zones which have been temporarily abandoned by the use of a bridge plug provided the well is recompleted in another zone; however, the zone must be properly abandoned in accordance with Statewide Rule 14 (C) when the well bore is finally plugged.
5. No Exception to Statewide Rule 14 (B) (2) will be granted on shut-in gas wells which are capable of production. These wells shall be reported on monthly Form P-2.

Under this new policy it is hopeful that much of the pollution which has been associated with unplugged wells can be avoided. Over 17,000 wells have been carried on Commission records as temporarily abandoned and it is estimated that there are as many more wells that are not properly plugged which have not been granted Exceptions to Statewide Rule 14 (B) (2).

As we review our situation today, we find that both the scope and the cause of the pollution problem is shifting, and there are factors of economics, emotion and self interest which must be understood and dealt with. The petroleum industry is concerned — and rightfully so — with what it regards as the unfairness of the image with which it is saddled as a polluter of the public waters. Their spokesmen point out quite reasonably that never before has the industry devoted so much of its time, money, and top technical personnel to the task of water protection. A long-range, continuing program will be necessary to cope with the salt water disposal problem.

We are not dealing with new problems; we are trying to avoid the recurrence of old problems. We know that the cooperation of the industry as it has long existed, will reduce the complaints which have been damaging to the entire industry, and will result in a more efficient utilization of the Texas oil and gas reserves. This, in the final analysis, is the sole reason for the existence of the Commission's Oil and Gas Division.