Organization & Operation Of Co-Operative Salt Water Disposal Systems

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INTRODUCTION

Many well known oil pools derive their producing energy from salt water. One of these water drive reservoirs which is familiar to us in this locality is the Hobbs Pool located in Lea County, New Mexico. To appreciate the value of this active water drive in the Hobbs Pool, we must examine the production history and try to visualize the tremendous energy exerted by this salt water.

In 1928, the discovery well was completed for a daily flow of 700 barrels and is still flowing! The pool has produced over 164 million barrels of oil from 330 wells, of which only 40 per cent are on the pump. A natural water drive replaces with water the space voided by the produced oil and gas, and affords the cheapest and most efficient mechanism for the recovery of oil.

PROBLEM OF SALT WATER DISPOSAL

Salt water becomes a liability only when it reaches the surface of the ground and some means of disposal is necessary. Subsurface disposal is the most satisfactory method of disposing of salt water — especially in pools where large volumes of salt water are handled or reservoir conditions exist which indicate that future water volumes will be appreciable.

It is a moral responsibility of everyone to protect our fresh water, one of our greatest natural resources. In this area the most important and prolific fresh water aquifers is the Ogallala formation which in some localities is approximately 200 feet thick. Other aquifers occur in the Triassic formations of which the Santa Rosa is the most productive.

Salt water disposal is a problem common to all the operators in an oil pool. Joint participation in a disposal system is practiced in order to accomodate water production from all the wells in a specified area at the least cost.

A cooperative or jointly owned salt water disposal system can be compared to a city sewer system, or an oil gathering system in an oil pool. It is designed, installed, and operated to serve all wells and parties equally in the most efficient and economical manner. The cost per producing well for a system to serve an entire pool can be held to a minimum by eliminating duplication of lines and disposal wells. Also, the operation of such a cooperative system can be more flexible and more efficient.

When it is recognized that a disposal system is needed and is a problem to all oil producers in a field, then the operators should meet and decide on the basic, rudimentary methods to be used to handle the produced water. Some years ago, company attorneys and accountants prepared Articles of Agreement which incorporated a unified system to provide for the creating, putting in operation, and prescribing rules and regulations for the operation of a salt water disposal system. Many operators have used these same Articles with success in their joint disposal systems. The basic features of such an agreement will be discussed in detail.

Three Requirements Necessary

Three requirements are necessary in designing a system. First, the subject area must be defined — whether or not it is an entire field, or segment of a field. The area under consideration must be described and limited. The next requirement is a definition of a producing well. This is important because the design must be based on a certain number of wells. The third requirement, and usually the most difficult to agree upon, is the quantity of water to assign each well in order to arrive at the best design figure.

Usually the subject area can be decided by taking a map of the pool and drawing a line which circumscribes all of parties' properties; however, invariably there will remain some windows or properties omitting certain operators who are short-sighted enough to believe that their properties will not produce any water. When the subject area has been defined, a well is either in the system and shares the cost of the system, or out of the system and does not share in the cost.

A producing well should be defined as any well capable of making fluid not plugged and abandoned. Dually completed wells should be treated as two wells as would also be the case of twin wells. Temporarily abandoned wells, in our opinion, should also be counted as wells, although this sometimes starts a lengthy discussion.

If the situation exists, as it does in some areas, where more than one pay zone is served by wells on the same acreage, and one or more of these wells is temporarily abandoned, then the acreage should be included but the subject area description must be shown in a supplemental exhibit listing the name, number and location of wells that will participate.

To decide on the quantity of water to assign each well so that a proper design can be made of the system, all available reservoir data must be examined. Bottomhole pressure decline figures are very helpful, together with oil, water, and gas production history and productivity indices, in determining this important design factor.

It is surprising to hear production engineers state that their company's wells will never produce 200 barrels of water per day, when their offset operator is currently pumping 700 barrels per day. In some water drive oil pools, a good per well future water figure can be derived by using the capacity of the pumping equipment available to lift the fluid from that particular pool's depth.

ARTICLES OF AGREEMENT

The Articles of Agreement provide for an Operator and a Governing Committee, with the Operator's representative generally designated as Committee Chairman. The Operator is in direct charge over the construction and operation of the system under the general supervision of the Committee. Single capital expenditures for the enlargement or betterment of a small system are usually limited to $1000 without approval of the Committee. On larger systems the limit may be higher.

The investment cost of the system is divided on a well basis among all the wells in the subject area with each

party having an undivided interest in the system in proportion to its contribution. Well interests are not transferable, but if a company plugs and abandons a well in the subject area for which they have purchased a well interest, that company can substitute an additional well thereafter completed or placed on production.

Operating costs are generally divided on connected well basis as of the first of the month for which the billing is rendered. Under some agreements, the operating costs are apportioned on a per barrel of water produced basis. This method is much more expensive because it is necessary to measure the quantity of water produced.

Labor and material bills are excessive and the burden of paying the operating costs is borne by the wells producing the most water. This results in a premature abandonment of the large water producing wells and results in shifting the operating costs to other smaller water producing wells. Ultimately, this method of operating cost allocation could result in a substantial volume of recoverable oil left in the reservoir.

Insurance Coverages

The Agreement provides for the Operator to carry certain insurance coverages for the protection of all the parties in the System. Some major companies require the following limits in recent agreements:

1. Workman's compensation insurance, including employers' liability in compliance with state laws.
2. Comprehensive general liability insurance, excluding products: in amounts of $100,000 for injuries to one person, $500,000 for injuries in one accident, for property damage in the amounts of $100,000 for each accident and $250,000 aggregate.
3. Automobile public liability and property damage insurance in amounts of $100,000 for injuries to one person, $300,000 for injuries in one accident and $10,000 for property damage.

The Governing Committee can appoint a Claims and/or Legal Committee to handle any claims arising by reason of water incident to the oil production.

Should any party fail to pay his proportionate part of the cost of the construction, operation, settlement of claims, then the Operator shall have a lien on the oil and gas leases of that party in the subject area.

Any party may withdraw from the agreement by giving the Operator 30 days written notice, but the withdrawing party forfeits his interest in the investment cost of the System.

Statements of investment and operating costs are submitted by the Operator before the tenth day of each calendar month and each party is supposed to pay his proportionate part within 15 days. Most major oil companies have a joint interest department where operating agreements are processed. This assures prompt handling of such billing.

Agreement Contains Three Exhibits

The agreement generally contains three exhibits: map of subject area, a cost estimate, and a detailed accounting procedure. It is the opinion of some companies that the cost estimate should not necessarily be a part of the Agreement, but should be handled separately. The fundamental purpose of the Agreement is to provide for an equitable division of System costs and operational charges among all parties.

Each party usually receives two copies of the Agreement — executes one copy and returns it to the Operator while retaining the other copy for his file.

The Agreement becomes effective only if enough parties sign for a specified total number of wells within a given period of time. Should the time expire before a sufficient number of wells are committed, the agreement becomes void. This protects each operator from the obligation of paying for a system that exceeds the cost because of a lesser number of participating wells.

CONCLUSION

Regardless of the Operating Agreement, no salt water disposal system will function properly throughout the life of an oil field, with a minimum of maintenance and operational disruption, without good engineering design, proper material selection and continual experienced supervision.