anyone else can provide a Universal formula for determining the value of a license. Furthermore, it is of critical importance to understand that the non-dollar costs of a license can be more burdensome than the dollar involvement. You risk restriction in licensing out of related developments, as well as the danger of uncontolled utilization of your own information by potential competitors. Your own incentives for research and developments in the field can be severely inhibited. You must carefully utilize the licensing function as a growth stimulant for your own research capabilities. Direct involvement of your technical people in evaluation and negotiation of licenses initiates new enthusiasm rather than unrealistic demoralization. Other points worth noting are:

1. As technology becomes older, it deteriorates in value. There should be a fully paid-up possibility and a rate reduction for expansions.
2. The licensee's largest risk is in his investment in plant capital. Optimum use of this investment often provides sufficient pressures to limit insistence on minimum annual payments.
3. Flowback of information to the licensor for use by your competitors severely limits the value of the license.
4. The value of a license increases in the licensor's eyes with advance in status of technology. Thus, a process in pilot plant offers higher risk (and lower value) to a licensee compared with an operating plant. As noted above, however, there can be compensatory advantages.
5. The elements of uniqueness offered through patents, know-how, lead times, and complementation of strengths, add value.
6. The portion of the total process involved relates to the value of the license.
7. The size of the project is pertinent. Large potential total dollar licensing income should reduce the per unit licensing fee.
8. The licensing cost should not significantly reduce profit expectations in highly competitive fields.
9. Maintain your alternatives and options to the last, and keep them visible to the seller.

The value of technology is usually negotiable, often with broader ranges of acceptability than are apparent in the first exchanges. In addition to the prime requisite of "doing your homework" beforehand, negotiators should avoid the five common pitfalls noted below[2]:

1. In approaching a negotiation, the inexperienced man will discard in advance any proposal he thinks the other side will object to.
2. The timid negotiator will not want to pose difficult questions.
3. A classic error is to signal the opponent that you are desperate to get some kind of agreement, especially for internal political reasons.
4. The over-gregarious negotiator will put a premium on being popular with the other side.
5. The over-eager businessman will try for accord by continually receding from an equitable position in return for nothing but short term harmony.

In conclusion

Remember, you may end up as the licensor. Of utmost importance is the requirement to act and react so that at any future time you can defend with pride any and all positions and tactics you have taken, not just at the negotiating table, but in every direct and indirect exposure of your company and personnel.

**About the Speaker: H. L. Pilat received his B.S. from the University of Oklahoma and his Ph.D. degree in organic chemistry from the University of Pittsburgh. He served as a Naval Officer in the Pacific Theater in the Second World War. He is currently director, External Technology, Chemical Group, Celanese Corp. He is a long time member of LES.*

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Chemical Engineers & the Construction Industry:

TRANSFER OF LICENSED INFORMATION

In the chemical industry, the transfer of licensed information is a relatively complex procedure so it is essential that both parties know what to give and what to expect.

by
T. G. Gillespie, Jr. and G. S. Schaffel***
Scientific Design Co., New York, N. Y.

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The first step in the complicated procedure of transferring licensed information in the chemical industry is the execution of a license agreement. Any license is a form of contract, and each contract has give-and-take portions to it with respect to the contracting parties. For example, the licensor will agree to "give" licensed information and the rights to use it. This right of use is generally set forth with respect to a plant, several plants, or a geographic area. For this "give," the licensor "takes" something. That is, the licensee agrees to pay royalties and, in certain instances, to feed back improvements that he may make with respect to the process.

The payment of royalty can be in the form of a lump sum payment for a specified paid-up capacity with an obligation to pay either running royalties in excess of that, or an obligation to buy increased amounts of paid-up royalties if the plant produces above the capacity for which a paid-up license has been purchased. Alternatively, there can be the obligation to pay running royalties at a specified percentage of the sales price for a given period of time. This has been found to be the most common form of royalty payment in the chemical industry. On the other hand, the petroleum industry leans toward paid-up licenses.

Each licensor and licensee has his own ideas of what form of royalty provision should be included in the license, a matter which must be bargained out at arms-length.

Similarly, each licensor and licensee generally has rather strong convictions with respect to any continuing exchange of technical information. The argument of the licensor is that he has provided the licensee with a fund of technical information which can be a springboard for inventive ideas and changes which would not occur to the licensee if he had not had this information made available by the licensor. Thus, it is in the interest of the licensor to provide some sort of provision for cross-licensing. This is generally a two-way street in that the inventions made within an agreed-upon time period can flow from both, and to both, the licensor and licensee.

Technical info and patent rights

When one goes about figuring out just what he is purchasing for his royalties, several cautions should be observed. First, there should be a well thought out definition of what is being purchased in the way of technical information and patent rights. One definition of technical information which we have found generally applicable is as follows:

"All patented inventions and improvements, trade secrets, technical information, and know-how relating to or useful in connection with a process (for example, for the production of maleic anhydride by the fixed-bed, catalytic, vapor-phase air oxidation of benzene) (including but not limited to the apparatus for carrying out such process, plant and equipment designs for the plant, drawings and specifications for the plant and operating details and instructions for the plant), and transferable interests in and rights with respect to any of the foregoing acquired by the party in question on or before (date), in each case to the extent that and subject to the conditions under which the party in question now has or hereafter shall have the right to grant licenses, immunities and other transferable rights thereunder."

In the like manner, patent rights may be defined as:

"All patented inventions and improvements, and patents and patent applications of all countries to the extent that they or the claims thereof cover a process (for example, for the production of maleic anhydride by the fixed-bed, catalytic, vapor-phase air oxidation of benzene) (including but not limited to the apparatus for carrying out such process, plant and equipment designs for the plant, drawings and specifications for the plant and operating details and instructions for the plant), and transferable interests in and rights with respect to any of the foregoing acquired by the party in question on or before (date), in each case to the extent that and subject to the conditions under which the party in question now has or hereafter shall have the right to grant licenses, immunities and other transferable rights thereunder."

The date for the termination of the exchange of information has to be determined by the parties involved. In many instances, the licensing period may extend for 10 yr. or more, but however long it lasts, it is in the best interest of the licensee that his right of access to the technical information continue at least until the plant has demonstrated the guarantees.

Whether or not the catalyst manufacturing know-how is included should be determined in the course of the license negotiations. There are arguments pro and con on this. It assures that the licensee can at least produce catalyst for his own use. However, in most instances, the amount of catalyst consumed by a particular plant does not warrant the capital investment nor the required maintenance and operating personnel. Most of the time it is better to enter a long term purchase agreement with a catalyst manufacturer operating on a scale sufficient to supply a number of plants. If the information is to be included, the definitions of technical information and patent rights should be suitably modified. If it is not to be included, and catalyst is to be purchased elsewhere, it is suggested that there be specific reference in each of these definitions excluding it, since it could be construed to be within the language "relating to or useful in" as set forth in the definitions.

The license agreement also should set forth the language in which the technical information is to be transmitted, and the times at which continuing transfer of technical information should occur if the cut-off date runs on for some length of time.

Transfer mechanism

If we look at the definition of technical information set forth above, we can see the sum of unpatented inventions and improvements, trade secrets, technical information, and know-how encompasses about four kinds of raw data. These are: 1) laboratory data, if this is to be an untried process, and 2) what we call "mini-plant data", which means that some design work has been done and the operation has been conducted on a mini-plant scale. For example, our company has commercialized a process conducted on a mini-plant scale consisting of an 1/8 in. dia. tube for high temperature cracking of a particular hydrocarbon. A third type is pilot plant data which, again, means different things to different people, but it's a small scale design compared to the commercial operation and, indeed, is operating data, if not on the entire sequence of process steps, at least on some of them. The fourth category is part of the data that are obtained from actual commercial operation. All of these will constitute raw data and must be sifted and evaluated by competent process people to assess their reliability and applicability to the particular plant that is the subject of the license.

The first thing that needs to be done in effecting the transfer of licensed information is the preparation of a preliminary process flowsheet. This takes place in two stages. First, all available data must be assembled so that the second step, the optimization of the preliminary process flowsheet, can get under way. There are three parts to this activity. First, a technical process design must be selected that will provide the best operation in a particular plant. This will probably involve consideration of various process alternates which must be looked at from both economic and freedom-from-patent-infringement points of view. The second factor to be considered is the yield that will be utilized.

This involves bringing the costs of raw materials and utilities into balance within the limits of the process capability. The final aspect, economic optimization, involves such considerations as materials of construction, sizing of equipment, suitable life for the plant, ease of maintenance, and the availability of land for plant construction.

Once a preliminary process flowsheet has been settled on, we can go forward with the preparation of a process package, which is the easiest way in which to transfer licensed information[1].

Process package

From a graphics standpoint, the process package should include process and project information, a reactor design, a plant layout, operating instructions for the proposed plant, and flowsheets indicating items of major equipment with their sizes or duties, materials of construction, temperature and pressure conditions, and heat and material balances for each item of equipment. Further, heat transfer data, consisting of condensing or evaporating curves for heat exchangers when a temperature range is involved, should be included along with equipment summaries for pressure vessels, pumps, mechanical equipment and heat exchangers, although these latter need not be rated. The operating conditions and physical properties of fluids to be handled should be given and, finally, there should be a rather detailed process description.

Supplementing this is project information consisting primarily of a write-up covering requirements which must be incorporated in the engineering flowsheets or in the final data sheets. Those items which should be covered include safety provisions, specialty valves, specialty instruments and the instrument requirements. In other words, the control instrument diagram should be prepared. It is convenient, for example, to indicate on this diagram the particular instrument utilizing Instrument Society of America symbols. Further, the reactor design should be provided which, at this stage of the game, should be a detailed drawing, but not a shop fabrication drawing. In addition, a suggested plant layout should be set forth at this time since it is a convenient means of transferring information with respect to operating and maintenance problems that must be dealt with in the course of plant operation.

Finally, the operating instructions, consisting of a preface which includes a brief plant description and a procedure for testing and preparation of the plant for initial operation should be prepared. These instructions ought to include details on tests for leaks, the methods of starting up, particularly by systems, if there is more than a single system involved, and normal and emergency shutdown procedures. Also, this manual should contain safety regulations, suggestions for personnel protection and minimal maintenance, as well as information on chemical analytical methods.

If the entire engineering work is not done by a single contractor, the licensor, that is, the originator of the technical information being transferred, should review and make comments upon engineering flowsheets, on plant layout as ultimately decided upon, and any special equipment design before these are fabricated. This is particularly important from the viewpoints of safety, ease of operation, and maintenance.

Language difficulties

Granting the degrees of sophistication among licensees, it is obvious that the transfer of technical information from one American firm to another would be much less complicated than if it were transferred from a U.S. company to a licensee in a developing nation[2], or to a country in which English is not the mother tongue. In such cases, care should be taken to insure that the transferred information is clearly understood. We have found that this is best accomplished if the information is repeated back to the licensor by the licensee.

The foregoing sets forth a convenient way of transferring technical information[3]. One final point worthy of mention is that if the licensor has had previous operating experience, many problems can be avoided if his services are utilized in the initial operation of the plant.

**T. G. Gillespie, Jr. is president and a director of Scientific Design Co., Inc. He joined the concern as patent counsel, and in 1958 was promoted to vice president in charge of legal and contract matters. He received his B.S.Ch.E. and M.S. in chemistry from the University of Notre Dame, and his LLB degree from the University of Indiana Law School. He is a member of the bar of the states of Indiana and Pennsylvania and has been admitted to practice before the U.S. Patent Office, the Court of Customs and Patent Appeals, and the United States Supreme Court.*

***G. S. Schaffel is a graduate of Carnegie Institute of Technology where he received the Doctor of Science in chemistry, following which he was appointed Post-Doctoral Fellow at the Westinghouse Research Laboratories. He has been associated with Westinghouse Corp., General Tire & Rubber Co., and Union Oil Co. of California and its subsidiary Brea Chemicals. 1956 he joined Scientific Design Co., Inc., as director of research and is presently a vice president of that company, responsible for licensing and corporate development.*

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