Engineering-Contractor's Role

Engineering-Contractor may play several roles in sale and purchase of licenses for large-scale process plants

BY THEODORE WEAVER*

My paper is developed around the theme that the nature of commerce in large-scale process plants does not follow a standard pattern. It varies considerably from project to project, depending on the immediate objectives of the licensee, the character of the process technology, the characteristics of both licensor and licensee organizations, and the business circumstances of the project at hand. As a result, an engineering-contractor may play several different roles in the sale and licensing of process technology.

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When his services are properly used, those roles stem primarily from special skills, experiences, and relationships that are characteristic of such an organization; project management, with all of its supporting activities of planning and control; a design organization that can pull together into a concerted effort, the real-life experiences of many different disciplines and many earlier projects, in order to solve a current problem; cost-data files and cost-estimating techniques that are seldom matched in other kinds of engineering organizations; a sales organization that is specialized in selling technical service; and very often, a project-financing team that can help to locate lenders and can facilitate loan arrangements.

Because some licensors — and licensees — have engineers with good professional competence in some of these individual areas, the particular support they need from an engineering-contractor will vary from project to project. It will be influenced by the size and complexity of the project, its geographical location, and the nature and novelty of the technology involved.

Perhaps the easiest way to make this clear will be to illustrate how the skills I have mentioned lead to particular activities in a variety of cases.

First, let me treat quickly the case in which the engineering-contractor is also the owner and licensor of the technology. This occurs rather infrequently, since engineering-contractors rarely engage in process research; but occasionally, through skillful engineering, they develop novel proprietary designs and patent positions that lead them to adopt this special role. In that case, many of the considerations are the same as for any other licensor, so I will deal with those cases in which the engineering-contractor has a unique position.

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Let's look at an engineering-contractor who is not associated with the competing technologies that are under consideration, a neutral party.

1. One group of roles stems from the ability to provide

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an independent cost estimate that will reflect the special circumstances of the buyer's project — the geographical location of the licensee's plant, the requirements of its particular size and site, and escalation from the time the licensor's cost data were developed to the time the licensee's project will be completed.

These skills may be used either for evaluating the profit potential of one process, or sometimes, even more significantly, for comparing several. In fact, in the latter case using a single engineering-contractor for the entire comparison may be essential, since preliminary cost estimates of competing technologies prepared by different organizations usually lack comparability. Then the discrepancies in engineering and estimating procedures can sometimes introduce cost differences that are larger than — and perhaps even of a different sign than — the real differences between the technologies. An engineering-contractor can apply consistent criteria to such design decisions as the sparing of equipment, the amount of intermediate storage, provisions for maintenance, ease of operation — for each of the technologies — and consistent estimating procedures, too, in order to make a comparison of both capital and operating costs that will lead to a reasonably-reliable ranking of the competitors, even though the absolute magnitude of costs is still uncertain.

2. A second group of roles stems from the ability to integrate the licensed process into an optimized, total facility. If the licensed process is to be part of a larger facility or complex, or if processes from different licensors are to be combined, there is a real need to begin in the early planning stages to ensure proper interfacing; to establish specifications for individual units that optimize the total facility rather than one particular licensor's unit; to optimize the total utility balance; and to define and specify all of the appropriate offsite facilities and supporting infrastructure.

An engineering-contractor can perform all these services and provide a meaningful cost estimate for the entire facility. When the licensee has an inexperienced organization, as for example the national oil or chemical companies of the developing countries, this service *must* be provided by a skilled, experienced engineering-construction organization. But many times even sophisticated

buyers ask for this help too.

3. Sometimes an engineering-contractor's combination of technical skills, experience and *neutrality* can create an opportunity for service — for example, when a potential licensee needs to evaluate a new technology but does not yet want to receive confidential information because he has his own competing process or has partially completed research, development, or engineering work in the same field. In that case, an engineering-contractor may be able to receive the confidential information and submit a non-confidential statement of comparative economics and a general appraisal of the suitability of the outside technology for the licensee's purpose, in order to help reach a decision on the desirability of going into a more-complete evaluation that would involve exposure to confidential information.

4. When an engineering-contractor has an active technology-surveillance group, it may prove helpful to potential licensees in identifying new processes or combinations of processes that should be evaluated in developing their new projects.

Shift in Position

Now, let's look at some of the circumstances that may lead an engineering-contractor to give up the role of strict neutrality and become associated to a greater or lesser degree with a particular process licensor.

5. Often a licensor's organization that is strong in research and development, plant operations, and product-development skills, has difficulty pulling experienced design and project engineers off other assignments to work up and deliver to prospective licensees the essential "process information packages" — simplified for the evaluation stage — complete with much detailed design work for project execution. In that case an engineering-contractor may accept the responsibility for preparing the packages as they are needed, either with or without a commitment to be an advocate of the process.

6. Sometimes an engineering-contractor is in a position to add to a licensor's basic technology, some technology or experience of his own in order to enhance the salability of both. For example, when a process is to be licensed before it has been commercialized, the development of a first commercial design may need a combination of the research-and-development work of the licensor with related engineering skills and experience of an engineering-contractor — or in other instances, a larger, more attractive package may be provided by combining a licensor's process with related technology developed by an engineering-contractor. For example, at Fluor we have combined our own advanced polymer-compounding and finishing facility designs with a licensor's basic polymerization process to make a more interesting offering to several potential licensees.

7. Some buyers do not make their selection of licensor on the basis of a detailed technical assessment of the competing processes, but rather by comparing large, single-responsibility packages. In the communist countries these packages typically include complete technical information plus detailed designs and specifications; major process equipment; process piping, instruments and controls; the services of construction advisors and inspectors; and sometimes complex loan and financing arrangements. In many of the developing countries an even larger package is required, i.e., a completely erected, operating plant, along with advisors to help keep the plant in operation for a substantial period after initial start up. Generally, such packages can be put together only by experienced, international engineering-construction organizations. Since the development of such packages is a costly undertaking, one usually finds a licensor or group of licensors and an engineering-contractor joining together as allies and advocates in a common effort to sell a particular, interesting project.

8. Successful promotion and selling of process technology often needs an international sales organization that is in touch with potential users throughout the world. Some of the international engineering-construction organizations have exactly that kind of sales organization, and are in a position to be of real help by screening and evaluating inquiries so that each may receive a response suited to the real nature of the business prospect.

Exclusive Relationship

Now let's look briefly at the special circumstances that can lead a licensor and an engineering-contractor to establish an *exclusive* relationship, in which the licensor makes his process available in a given geographical region or business field, only through that engineering-contractor, who in turn agrees to sell, design, and construct only that licensor's version of the subject process.

It's my view that only infrequently does one find a business situation in which such an arrangement is in the best interests of both parties. Nevertheless, I can suggest two general circumstances which may justify it.

In one, the licensor finds that in order to sell his process he must have a cooperating engineering-contractor that will accept substantial, extraordinary expense and/or risk. This may be in the form of costly sales-service engineering, costly or risky lump-sum bids, or unusual responsibility for the performance of the finished plant. In return, the engineering-contractor will want assurance of a substantial, protected market opportunity commensurate with his unusual costs and risks.

In the second general circumstance that can justify exclusivity, maintaining a competitive position *requires* continuing, close collaboration between the personnel of licensor and engineering-contractor to attempt to insure that each latest design will stay ahead of those of their competitors. This, in turn, usually occurs only when the process chemistry and unit operations differ little from those of the competitors, and advancements come not from better catalysts — or new chemistry or other laboratory or pilot-plant work — but from evolutionary engineering innovations that grow out of the experience of designing, starting, and testing a succession of plants.