AGREEMENT — 11th Extension. *EFFECTIVE DATE* — Jan. 1, 1946. *COVERAGE* — Same as 2nd Extension (Jan. 1, 1930 patents) but extended licenses thereunder to Jan. 1, 1947 when all of the patents will have expired. (Analogous to present situation).

AGREEMENT — 12th Extension. *EFFECTIVE DATE*— Jan. 1, 1947. *COVERAGE*— All U.S. patents (excluding designs) covering the *passenger* car only owned or controlled by the companies on Jan. 1, 1940 and extended royalty-free licenses thereunder to Jan. 1, 1952, except with respect to patents covering inventions of subsidiary companies, divisions, and departments or sections operated as part of a division not engaged in the manufacture of a complete vehicle and patents of a subsidiary or division manufacturing motor busses.

AGREEMENT — 13th Extension. *EFFECTIVE DATE* — Jan. 1, 1952. *COVERAGE* — Same restrictions and exceptions as 12th Extension (Jan. 1, 1940 patents) but extended licenses thereunder to Jan. 1, 1957 when all of the patents will have expired.

*Please note that all patents covering inventions relating specifically to trucks, fire apparatus, tractors, ambulances and motor busses are excluded from the Original Agreement and the succeeding extensions. The Original Agreement only provided for Class A and Class B. patents, the classification to be decided by the NACC. Class A patents were automatically included on a royalty-free basis. Class B patents were to be excluded from the Agreement. Provisions were made for submission of the NACC decision on classification to arbitration.

***About the Speaker: George W. Talburtt is Chief Patent Counsel for the Chrysler Corporation.*

William J. Baral

LICENSING IN THE PETROLEUM INDUSTRY

by
*William J. Baral**

The Union Oil Company of California is a fully integrated petroleum company with annual sales in 1971 of 2.3 billion dollars. The company is moderately active in petrochemicals and is diversified in a number of other fields but the major business is petroleum. All of Union's research activities are centralized in a Research Center at Brea, California, where approximately 600 personnel are employed.

The Technology Sales Division of the Research Department has the responsibility of actively administrating Union's licensing program and negotiating business arrangements to develop cash income or technical assets through industry use of Company patents and know-how. It also has, as a subordinate function, the accumulation and dissemination of information on technical trends in the process industries and currently available licenseable technology from others.

It is Union's policy to license all technology, patent and know-how, except where an operating division or a subsidiary have a predominating interest in maintaining an exclusive position for the Company. The products of Union's research effort are treated as marketable commodities that can be converted to direct cash income or other valuable considerations. The Technology Sales Division aggressively seeks new business through-out the world. This is done by maintaining close contact with petroleum companies, petrochemical companies, engineering contractors, and service companies. It also keeps abreast of developments and trends in the industry through participation in society meetings and trade literature studies.

Technology Sales is headed by the Associate Director of Research for Technology Sales, who is responsible directly to the Vice President for Research. The Division consists of five professional personnel and two secretaries. In order to maintain maximum flexibility, the professional personnel, insofar as possible, maintain sufficient familiarity with all of the available technology to enable them individually to handle preliminary discussions with potential licensees. However, in addition to this general familiarity, responsibility for in-depth knowledge of specific subjects is assigned to individual members of the Division as appropriate to provide a source of consultation and advice to other Division members and to Management.

The Division is responsible for the handling of all inquiries received by Union and its subsidiaries relative to the licensing or purchase of Company technology. It generates responses to these inquiries, calling on other research divisions, other corporate divisions or the appropriate subsidiary for information if necessary. Ultimately, it formulates the business proposals on the license or sale, and after obtaining Management authorization negotiates the final business terms of the license. When negotiations on the business basis have reached a definitive point, the license agreement is negotiated by the Patent Division with consultation from Technology Sales. Thereafter, in most cases, technological matters under a license are handled by the appropriate research division directly with the licensee, while Technology Sales remains responsible for maintaining business liaison with the licensee. Where Union *takes* licenses from other companies, the Patent Division has primary responsibility, but Technology Sales participates as consultant, particularly where the possibility exists for part or full payment by exchange of technology.

The Technology Sales Division operates under annual expense and income budgets, with defined objectives on new income to be generated during the budget period. The income budget includes both royalty income from licenses and service fees from reimbursed service work. The service work usually is pilot plant work conducted on a cost-plus-fee reimbursed basis for other companies. The expense budget includes the direct operating expenses of the Division, and indirect expenses resulting from charges by other divisions for the preparation of information for use in proposals and responses to inquiries. Information developed by other divisions of the Research Department upon request of Technology Sales is charged against the Technology Sales operating budget on a full-cost basis.

The creativity of Union's Research Department and the positive licensing program have combined to provide substantial annual cash royalty income. The income generated from licenses increases the return on research investment and often justifies added research effort in certain fields. In addition to cash income, the licensing program provides other benefits including:

1. A relative measure of research success.
2. Enhanced corporate image.
3. Motivation of research scientists and engineers.
4. Favorable acquisition of technology on a trade basis.
5. Development of technology trend and planning information.

Union's license activities are as broad and varied as the many fields in which Union Research has been successful. Licenses range from a simple patent immunity for use of a specialty additive with total income in the range of a few thousand dollars to a broad patent and know-how license for use of a sophisticated refining process with total income aggregating several million dollars. Over 80 percent of cash income derives from process licensing, particularly processes based on catalytic conversion of petroleum with hydrogen.

The most successful licensing activity at the present time is the Unicracking-JHC hydrocracking process, which is licensed by Union and by Esso Research and Engineering Company. This process typically converts 100 volumes of low quality sulfur and nitrogen containing fuel-oil-type distillates into sulfur and nitrogen free LPG, gasoline stocks or aviation turbine fuel. It is typically licensed on a broad basis including a field definition with both patent rights and know-how to a specific cutoff date. Narrower licenses to either the know-how or the patents are of course available but thus far essentially all licensees have wanted the complete process package.

A comprehensive petroleum process license such as that for Unicracking-JHC, includes the following. Some of the elements have been paraphrased for brevity.

1. The defined process is:

The term "Hydrocracking" shall for the purpose of this Agreement mean any process in which feed materials consisting essentially of distillate petroleum hydrocarbons containing at least 5 carbon atoms per molecule are converted to products in a yield of at least 110 moles of product hydrocarbons containing at least 3 carbon atoms per molecule per 100 moles of said C5+ feed hydrocarbons, such conversion being carried out,

(a) at a temperature in the range of 400 to 950°F, and at a total pressure in the range of 500 to 5,000 psig,
(b) in one or more stages, each of which is under super-atmospheric hydrogen partial pressure,
(c) With one or more catalysts, at least one of which is a Molecular Sieve Catalyst,
(d) in the presence of free hydrogen introduced into the reaction zone and with a net chemical consumption of at least 250 standard cubic feet of such hydrogen per barrel of hydrocarbon feed.

2. The granted know-how is defined as:

The term "Hydrocracking Process Technical Information" shall for the purpose of this Agreement, mean technical information which was, prior to January 1, 1973, used commercially or ready for commercial plant use in a plant for the commercial practice of Hydrocracking Process.

3. Immunities are granted to patent rights defined as:

The term "Hydrocracking Process Patent Rights" shall mean patents and patent applications of all countries, to the extent that they or the claims thereof cover one or more features of Hydrocracking Process (including Molecular Sieve Catalysts for carrying out such process), which are based on inventions made prior to January 1, 1973.

4. Cross Grants apply in several ways:

A cross-grant of Licensees existing Hydrocracking Process Technical Information as well as future know-how up to the defined cutoff date is required. A cross-grant of future Hydrocracking Process Patent Rights is obligatory up to the defined cutoff date but Licensee has the voluntary right on existing patent rights to:

(a) exclude them,
(b) include them for the benefit of other licensees that give a reciprocal grant, or
(c) include them for value received by negotiation with the licensor.

5. A specific grant makes available adequate Hydrocracking Process Technical Information to enable licensee and its contractor to design and construct a licensed unit for the commercial practice of Hydrocracking Process in a specific country. This information is usually presented in the form of a Process Design

Specification. An Engineering Service Schedule is included in the agreement to define peripheral services such as design consultation, key drawing review and plant startup assistance. Some of these items require separate payment in a defined manner.

6. A Most Favored Licensee clause preserves equality among licensees and is usually limited to the country of use.

7. A Process Guarantee is a prime consideration for the license. It is usually supported by 1/3 to 1/2 of total royalties payable for a fully-paid license for the plant in question. A completely separate agreement is usually drawn to define the terms, indemnities and definition of the guarantee.

8. A Defense and Hold Harmless clause is included, supported by typically one-half of the royalties received to the date of judgment. Such protection is not normally granted outside the United States.

9. A Royalty Schedule defines a fully-paid royalty rate with method of payment either as lump-sum, multiple payments or running royalty options with conversion privileges to a fully-paid basis.

10. It is usual to grant the license for use in a single country primarily to avoid being involved with the laws and patent structures of different countries. It is also usual, however, to provide relatively simple means for extending the license to other countries if desired by the licensee.

These then are the elements of a comprehensive petroleum process license. The fully-paid royalty rate for the Unicracking-JHC process is 40 cents per annual barrel of throughput which is equivalent to $146 per daily calendar barrel of plant throughput. If one assumes a typical operating life for the plant of fifteen years, the royalty based on product value is less than one percent. This is typical for petroleum processes, many of which are licensed for as low as 0.1 percent or less.

Competitive United States market patterns in the petroleum industry have foreclosed the opportunity to obtain any front money payments in most cases. Typically, a modest engineering fee is paid for the process design specification with no royalty payments due until the plant starts operation. Most licenses have what are called regular running royalty and accelerated running royalty rates. The regular running royalty is lower and may require payment as long as the process is used or may have a small percentage conversion as a credit to be applied against obtaining a fully-paid license in say ten or more years. The higher accelerated running royalty rate generally provides for a high percentage of the payment to be applicable to acquisition of a fully-paid license in say three to seven years.

On U.S. Unicracking-JHC licenses, normal running royalty rate has been five cents per barrel of feedstock with half applicable to a fully-paid license. On this basis, the plant license is paid-up in sixteen years. The accelerated rate is 10 cents per barrel of feedstock, fully creditable. Here the plant license is paid up in four years. On foreign licenses, a lump-sum payment of full royalty for a given plant is required. However, competitive pressures have resulted in easing of terms. Many times now, for example, one third of the royalty will be paid at time of licensing, one third at plant startup, and one third at one year after startup.

After concluding the license, preparing the process design, and consulting during engineering and construction, the licensor can see his process embodied in a plant that is complete and ready for startup. In petroleum process licensing, it is customary to provide the licensee with three or four trained personnel for consultation during plant startup and test run. The licensee pays a per diem fee plus expenses. After startup, which may take from several weeks or more, the licensor still carries a responsibility. This is the important follow-up stage.

Even with widely used and relatively old processes such as simple hydrodesulfurization, technology constantly changes and improves. The use of new equipment, improvements in catalysts, basic chemical engineering development of ideas not previously fully developed, all can have a profound effect on the

1972	**LES CALENDAR 1972**
June 4	Meeting of World Wide Board of Trustees, LES, Pugnochiuso, Italy.
June 4-6	LES Italy — Pugnochiuso, Italy, Guido Jacobacci, Registrar "International Licensing in the 70's"
August 1	Deadline — LES NOUVELLES copy for September issue
End of August	LES Scandinavia Annual Meeting, Stockholm or Helsinki
September 25-27	LES — Japanese Licensing Conference, Tokyo Prince Hotel — Tokyo, Japan.
October 25-27	LES Annual Meeting, Hotel Hilton Palacio del Rio, San Antonio, Texas., Tom Copeland, Chairman.
November 5	Deadline — LES NOUVELLES copy for December issue
November 6-12	"Know-How '72", Sponsored by LES Chapter, LES and the Export Council Conference of Norway.
April, 1973	International Licensing Conference in London, U.K.
Mid-October, 1973	U.S. Annual Meeting, San Francisco, California — Bill Poms, Chairman.

advancement of an existing process. Here the licensor can take the initiative to gather process know-how from all licensees and serve as a clearinghouse to relay information to all licensees of the particular process. This can be done by periodic personal calls of technical and technology sales personnel at the licensees plants and offices and by publication of periodic review papers at technical meetings.

In conclusion, it is hoped that this review of petroleum process licensing will be helpful to my colleagues from other industries. There are many fine companies active in licensing in the petroleum industry. As a whole this pattern of licensing just discussed has evolved from the experience of many and from the competitive nature of the technology marketplace in our industry.

******About the Speaker: William J. Baral is Associate Director of Research, Union Oil Company of California.*

General Session: Western Regional Meeting, La Quinta, California.

Photos, Social Events, Western Regional Meeting.