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**Maintaining Effective Patent Portfolios in the Biodiesel Industry**

From the Winter 2017 print edition of Biodiesel Magazine, Banner & Witcoff attorney Benjamin C. Spehlmann provides his legal perspective on the complex but important topic of patent protection in the area of biodiesel technology.

By Benjamin C. Spehlmann | January 10, 2017

Breakthrough technologies with promising commercial potential must be patent protected using a comprehensive and robust approach. Often, multiple patent families, each based on certain inventive aspects of the technology that are described in a single patent application, are pursued by filing corresponding family member patent applications in countries of greatest strategic interest. The total number of patent applications and patents in a technology portfolio, essentially the product of the number of families and number of countries for each family, can easily grow into the hundreds.

An important, emerging biofuel production process is the IH2 Process, which has been developed by Gas Technology Institute in Des Plaines, Illinois. This technology is currently licensed worldwide by CRI Catalyst Co., which is part of CRI/Criterion Inc., the global catalyst technology company of the Shell Group. The IH2 Process can achieve essentially complete deoxygenation of biomass, including plant-based (lignocellulosic) feedstocks, rendering diesel boiling-range and other hydrocarbons that are indistinguishable from their petroleum-derived counterparts. The prevalence of suitable starting materials has been a factor in the decision to maintain a broad-based patenting strategy for the IH2 process, which is protected by patent families having, as exemplary domestic patent family members, U.S. Patent Nos. 8,492,600; 8,841,495; 8,859,831; 8,915,981; 9,447,328; and 9,512,364, as well as a number of U.S. pending applications.

**Ongoing Input**

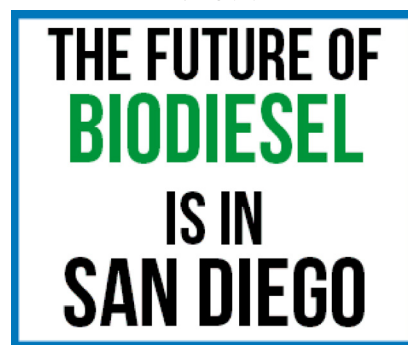
Delays between the filing of family member patent applications and the time they are first examined by patent offices of the various countries are often more than a year. During this time, a contemplated commercial technology undergoing development can evolve significantly. Also, further information regarding competitor activities will become available. Consultation with technical experts is required to understand and consider these factors, which can critically impact the process of negotiating the scope of the patent owner's rights. This process frequently involves amending the patent claims that define the scope of these rights to overcome initial rejections. Even if claim amendments are deemed to sufficiently distinguish an inventive process over the prior art, the resulting claims may nonetheless (i) fail to read on the contemplated commercial design or otherwise (ii) be easily avoided (i.e., designed around). In either scenario, the value of the resulting patents in a patent family is severely compromised.

Technical experts are also most familiar with the story behind their inventive activities, which led to the substantial investment in seeking broad-based patent protection in the first place. Patent examiners in the biodiesel area, by virtue of their scientific—typically chemical engineering—backgrounds, are generally receptive to in-depth technical arguments as to why the inventor's solution would not have been obvious in view of the existing knowledge in the field. Having an inventor present in an examiner interview at the U.S. patent office, for example, can lead to a deeper appreciation of what might otherwise be dismissed as "attorney argument."

**Alignment with Business Objectives**

As with technical developments, business objectives may change over time. Certain starting materials (lignocellulose, algae), end product properties (sulfur content, cetane number),

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byproducts (methane, char, CO<sub>2</sub>) and their uses, and process flow schemes, may become more or less economically attractive or significant in terms of customer requirements. As new patent applications are added to a developing portfolio, they should include updated information, for example by expanding the feedstock definition or description of how the technology might be integrated with conventional refining processes. Patent claims can be directed only to the subject matter that is described in the application as originally filed. Adding to and updating what is normally considered boilerplate information increases flexibility in how an invention can be defined.

#### Mining Relevant Property

The initial set of claims drafted for a patent family might not cover all patentable concepts described in the application. Otherwise, multiple claim formats may be presented but regarded under the laws of the local patent office to cover multiple inventions, from which one must be selected. In either situation, more than a single patent application could be required to realize the full value of the inventors' contribution to the state of the art. For example, a parent application of a family might present claims directed to unique and advantageous operating conditions, such as those used for generating sufficient hydrogen from biomass to sustain the claimed process. However, a continuation or divisional—with the designation often depending on the particular country—might be necessary to protect important properties of the resulting diesel boiling-range hydrocarbons, such as their low oxygen content. Any subject matter that is disclosed in a patent application, but not ultimately claimed, becomes dedicated to the public. For this reason, the potential for filing further applications in a patent family should always be evaluated.

Overall, effective, global patent protection requires developing a portfolio with an understanding of not only the technology itself, but also the inevitable, ongoing refinements in its envisioned design and implementation. Such refinements arise from both technical and business considerations.

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