VALUATION OF GREEN TECHNOLOGY[1]

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In the new and rapidly emerging markets for green technology, intellectual property licensing rates are often not "established" for purposes of calculating a reasonable royalty under the first of the fifteen factors set forth in *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970),[2] which is the leading case on calculation of reasonable royalties for patent infringement. For a royalty to be "established," it "must be paid by such a number of persons as to indicate a general acquiescence in its reasonableness by those who have occasion to use the invention." *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1078 (Fed. Cir. 1983) (citing *Rude v. Westcott*, 130 U.S. 152, 165, 32 L. Ed. 888, 9 S. Ct. 463 (1889)). For example, "a single licensing agreement does not generally demonstrate uniformity nor acquiescence in the reasonableness of the royalty rate." *Id.*

Therefore, a recurring question arises concerning the appropriate *Georgia-Pacific* factors or other metrics for valuing green technology. This memorandum summarizes cases that arguably address green technology, and therefore may be appropriate for future application to green technology valuation issues.

I. Royalty as a Percentage of Cost Savings.

Hanson involved an improved method of making snow for winter sports. Prior to the Hanson invention, snowmaking involved mixing water and compressed air and ejecting the combination under high pressure from a nozzle. The water froze and, by combining with water in the air, produced snow crystals. This method required a

[2] The fifteen *Georgia-Pacific* factors are: 1. The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty. 2. The rates paid by the licensee for the use of other patents comparable to the patent in suit. 3. The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold. 4. The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly. 5. The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter. 6. The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales. 7. The duration of the patent and the term of the license. 8. The established profitability of the product made under the patent; its commercial success; and its current popularity. 9. The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results. 10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention. 11. The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use. 12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions. 13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer. 14. The opinion testimony of qualified experts. 15. The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee -- who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention -- would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.

considerable amount of energy to compress the air, and the nozzles frequently froze. *Id.* at 1076. The Hanson invention involved discharging water into a hub mounted in the center of spinning propeller, which fragmented the water into droplets generating spontaneous ice nuclei. The efficiency of the Hanson snowmaking system, as opposed to the prior art method, was based upon the turbulence of the air created by the airstream which increased cooling capacity. *Id.*

The district court found that Hanson's patented airless snowmaking method was "*at least five to seven times as energy efficient as the prior art compressed air method.*" *Id.* (emphasis added). Hanson's energy efficient method translated into cost savings of "$75.00 per gallon (of water used to make snow) per minute. That is, under the Hanson method, the cost of producing snow using one gallon of water for one minute is $75.00 less than the cost of producing snow under the compressed air method using one gallon of water for one minute." *Id.* at 1077.

The district court found that that there was no evidentiary basis for lost profits, and therefore awarded a reasonable royalty of 33% of the $75.00 savings per gallon of water that the Hanson method produced over the earlier compressed air method. *Id.*

On appeal, the Federal Circuit noted that, because of the lack of an established royalty, the district court calculated a royalty based on the outcome of a hypothetical negotiation between the licensor and licensee to arrive at an award of a reasonable royalty for use of the invention. The hypothetical negotiation is a willing-buyer/willing-seller concept, in which a suppositious meeting between the patent owner and the prospective user of the invention is held to negotiate a license agreement. *Id.* at 1079.

Further, when there is no established royalty, "reliance upon estimated cost savings from use of the infringing product is a well settled method of determining a reasonable royalty." *Id.* at 1080-81. "The method is appropriate where other approaches (such as established royalty or lost profits) would be 'difficult.'" *Id.* (citations and quotations omitted). The Federal Circuit credited the district court's finding that a reasonable royalty would have been 33% of the estimated cost savings resulting from use of the Hanson method over the prior art method. *Id.* at 1080.

In *Joy Technologies, Inc. v. Flatkt, Inc.*, 954 F. Supp. 796 (D. Del. 1996), the court awarded 25% of cost savings for infringement of a patent on flue gas desulfurization ("FGD"). Two types of FGD were at issue: a single pass process and a patented recycle process. The primary difference between the two processes was the amount of lime needed to run each process. The patented recycle process conserved the amount of lime used by continually recycling the unreacted lime in the fly ash back into the lime slurry. Consequently, the patented recycle process required less lime and was more cost effective.

The court relied on the opinion testimony of qualified experts and *Georgia-Pacific* factors two, five, seven, eight, nine, and fifteen. The agreed upon methodology for calculating a reasonable royalty was to take a percentage of the lime savings realized between recycle and single pass.

Plaintiff argued that a reasonable royalty was 33% of the cost savings between the recycle process and single pass process that Plaintiff would have sought in a license for

the right to bid a recycle system. Plaintiff argued that Defendant could have built the royalty into its bid price and still underbid Plaintiff's bid. Plaintiff argued that Defendant could pass on the royalty cost to its customer and still maintain its competitiveness.

Defendant's expert testified that a more realistic royalty was 15% of estimated cost savings and that Defendant's estimated royalty as a percentage of total cost was 1.7%, and that the 14% estimated royalty rate (as a percentage of total cost) argued by Plaintiff was completely out of line with industry standards.

At trial, Defendant's expert relied on a European license agreement between the parties for similar technology. The European license agreement as a percentage of total cost was 3% on sales using the patented systems and 1% on sales using Defendant's systems. When asked to speculate on the maximum royalty Defendant would be willing to pay in 1982 given Plaintiff's apparent monopoly of the recycle process, Defendant's expert said 3% of total cost.

On the record before it, the Court found that a reasonable royalty under the circumstances of a licensing negotiation between Plaintiff and Defendant in 1982 for a license to utilize the patented recycle process was 25% of the savings between the use of patented recycle process and the single pass process.[3]

II. Royalty as a Percentage of Construction or Manufacturing Cost.

Activated Sludge, Inc. v. Sanitary Dist. of Chicago, 64 F. Supp. 25 (N.D. Ill. 1946) is another case involving lack of established royalty. The case is an interesting retrospective of Chicago's water supply and sewage treatment history, including the infamous engineering solution of creating a drainage canal that reversed the flow of the Chicago River (carrying sewage effluent) to avoid pollution of Lake Michigan, which was and is the city's drinking water supply. Unfortunately, the solution created severe pollution in the canal and in the rivers below it. Eventually, Chicago decided to reduce the waste stream through a treatment solution. One proposed solution involved tanks and sprinkling filters, however, it was objectionable because of odors and other nuisances. Eventually, Chicago adopted the patented "activated sludge" treatment method, which

[3] Although it is not explicit in the cases, the awards in *Hanson* and *Joy Technologies* may have been based on the "rule of thumb" for calculating reasonable royalties, which is that an inventor should keep 25% (plus or minus 10%) of the anticipated profits or cost savings associated with infringement. ROBERT GOLDSCHEIDER, LICENSING BEST PRACTICES 42-44 (2002). The rule of thumb is sometimes called the "25 percent rule." Robert Goldscheider, et al., *Use of the 25 Per Cent Rule In Valuing IP*, LES NOUVELLES, at 123, Dec. 2002. While the rule was oft criticized, *see id.*, it was frequently applied by damages experts and courts in litigation in arriving at a reasonable royalty. *i4i Ltd. P'Ship v. Microsoft Corp.*, 598 F.3d 831, 853 (Fed. Cir. 2010) (admission of expert opinion relying on 25 percent rule not an abuse of discretion). Recently, the Federal Circuit held that "the 25 percent rule of thumb is a fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation. Evidence relying on the 25 percent rule of thumb is thus inadmissible under *Daubert* and the Federal Rules of Evidence, because it fails to tie a reasonable royalty base to the facts of the case at issue." *Uniloc USA, Inc. v. Microsoft Corp.*, 2011 U.S. App. LEXIS 11, at *56 (Fed. Cir. Jan. 4, 2011). The Federal Circuit did note that *Georgia-Pacific* factor 12 (portion of profit that may be customarily allowed in the particular business for the use of the invention or similar inventions) remains a valid and important factor, but "must be tied to the relevant facts and circumstances of the particular case at issue and the hypothetical negotiations that would have taken place in light of those facts and circumstances at the relevant time." *Id.* at **64-65.

resulted in a treatment plant with "absolutely no odor" and effluent "[a]lmost as clear as drinking water, and quite as harmless." *Id.* at 30.

The court noted that "the evidence here … is conclusive that there has not been at any time an established royalty which could be applied as measure of damages in this case." *Id.* at 27. In calculating a reasonable royalty, the court evaluated several sources of proof.

Plaintiffs presented evidence of $11,053,790 in construction and operational savings achieved through use of the infringing treatment plants, as well as potential profits from the sales of sludge as fertilizer. While the court found that "the monetary savings were tremendous[,]…[t]he exact amount is unimportant, for savings as such, are not the monetary yardstick of defendants' liability," but only a "factor to be considered in determining a reasonable royalty…" *Id.* at 33.

Plaintiffs also suggested that a royalty could be measured by a percentage of the cost of the infringing plants. *Id.* at 32. A rate of 1 ½ to 10 % would produce an award anywhere from $492,908.54 to $3,286,056.95. *Id.* at 33. Defendant relied upon plaintiffs offer to settle with other municipalities for 1 ½ % of plant cost – the court noted that in order to make plaintiffs whole in current dollars, 5 % statutory interest would have to be awarded, raising the total award to over $1 million. The court also considered as a factor plaintiffs' previous offers to settle or grant licenses (and apparently actual settlements and licenses) to other municipalities, but did not find these offers and licenses determinative since they were not made under open market conditions, but under the cloud of litigation. *Id.* at 33-34. After considering all the evidence, the court awarded plaintiffs $950,000, plus costs, but did not mention whether interest would be awarded. *Id.* at 36.

It is not clear how the court calculated the $950,000 royalty, however, the award approximated the 1 ½ % of plant cost offer, plus interest, that was made to other municipalities.

III. Royalty as a Percentage of Profit Margin.

Paice LLC v. Toyota Motor Corp. is another case demonstrating damages calculated from a reasonable royalty applied to the cost of the infringing product. The patent at issue in *Paice* involves drive trains for hybrid electric vehicles. In hybrid cars, the wheels are driven using torque supplied by an internal combustion engine ("ICE"), an electric motor, or a combination of the two. *Paice LLC v. Toyota Motor Corp.*, 504 F.3d 1293, 1296 (Fed. Cir. 2007). As a result, the relative torque contributions of the ICE and electric motor must be combined and controlled. *Id.* Addressing this issue, the patent in *Paice* employed a controllable torque transfer unit that accepts torque input from both the ICE and electric motor. *Id.*

The Federal Circuit affirmed the district court's finding that the drive train used in Toyota's hybrid models infringed two claims of Paice's patent under the doctrine of equivalents. *Id.* at 1316. The Federal Circuit, however, remanded the case to the district court for further explanation justifying the court's decision to impose an ongoing royalty of $25 per infringing vehicle. *Id.* at 1315. The Federal Circuit explained that the district court's order provided no reasoning to support the selection of $25 per infringing vehicle as an ongoing royalty rate. *Id.* Since there was no support in the record, the Federal

Circuit was unable to determine whether the district court abused its discretion in setting the $25 ongoing royalty rate. *Id.*

On remand in *Paice LLC v. Toyota Motor Corp.*, 609 F. Supp. 2d 620 (E.D. Tex. 2009), the district court began with an application of the 25% "rule of thumb" to Toyota's profit margin of 9% per vehicle, yielding a royalty rate of 2.25%.[4] *Id.* at 630. From there, the court decreased the rate by 1/3 to 1.5% because Toyota, as a general matter, makes less profit on its hybrid vehicles than its non-hybrid vehicles. *Id.* Finally, the district court decided that the 1.5% figure should be applied to the hybrid power train value exclusive of the internal combustion engine because it is not a core component of Paice's invention. *Id.* Thus, 1.5% of $6,500 yielded a per-vehicle ongoing royalty of $98. *Id.*[5]

IV. Royalty as a Percentage of Gross Sales.

Power Specialty Co. v. Connecticut Light & Power Co., 80 F.2d 874 (2nd Cir. 1936) involved an "economizer," which was a device used in a steam generating plant. It used hot waste gases from a boiler furnace to preliminarily heat the water before it went to the boiler. In order to justify its installation, it had to be purchased within a certain maximum cost. Only 15 percent of the power plants were equipped with economizers. There were alternative technologies available. *Id.* at 875. The trial court awarded lost profits as damages, but because of insufficient proof, the award was largely reversed. The Second Circuit noted that "[w]ithout sufficient proof, as here, the damages should be measured on the basis of a reasonable royalty." *Id.* at 877. Plaintiff's vice president testified that a royalty of 20 to 25 percent was reasonable." *Id.* at 878. With no analysis, the court stated that "[w]e think a reasonable royalty on all the evidence would be 15 per[cent] of the moneys appellant received for these 22 jobs, and that this should be allowed." *Id.*

Little can be gleaned from *Power Specialty* other than to observe that there were non-infringing substitutes for the patented invention on the market, and that perhaps the court discounted the patent owner's claim for a higher royalty as a result.

In *Water Techs. Corp. v. Calco, Ltd.*, 714 F. Supp. 899 (N.D. Ill. 1989), the court awarded 20% of gross sales as a reasonable royalty for infringement of a patent covering "demand bactericide resins" that disinfected water without leaving a detectable concentration of iodine. Plaintiffs argued for a 30% of gross sales royalty, noting the infringer's 73% profit margin. Defendants argued for 5% of gross sales. The court stated that Plaintiffs' request was too high because of the limited commercial success of the patents and that a royalty based on profit margin would inappropriately bring a "lost profits standard, which the Federal Circuit has already rejected for this case, in through the back door." The court stated that Defendants' figures were too low because they were based on a license entered into between the Defendants with prior knowledge of

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[4] See discussion of Federal Circuit's recent rejection of the 25 percent rule in *Uniloc*, n.3, *supra*.

[5] It is interesting to note that the royalty rate in *Paice* began with the now rejected 25% "rule of thumb," but then was modified to more accurately compensate Paice for the specific aspect of Paice's invention that was infringed.

Plaintiffs' patents. Accordingly, the court doubted whether the license was *bona fide*. The court noted the difficulty in setting a royalty because the resin at issue was a new product, and therefore Plaintiffs were unable to present evidence on the royalties or profit margin on comparable products. Ultimately, the court concluded "that twenty percent is a reasonable royalty." 714 F. Supp. at 907.

In *Total Containment, Inc. v. Buffalo Environmental Products Corp.*, 1995 U.S. Dist. LEXIS 19845 (E.D. Va. Mar. 9, 1995), the court awarded 10% of gross sales as a reasonable royalty for infringement of two patents covering sumps for underground storage tanks. The court also awarded lost profits for certain sales. In evaluating a reasonable royalty, the court noted that TCI had an established policy and marketing program to maintain its exclusive rights by not licensing others to use the invention; that TCI sumps were commercially successful and popular in the relevant market; that TCI's patented sumps had utility and advantages over prior sump devices; that there was no customary rate nor analogous inventions upon which one could look for an agreeable rate; that TCI properly marked its products with its patents; that TCI had no other comparable licenses; that TCI and Buffalo were direct competitors; that both TCI and Buffalo had high profit margins on their products; and that Buffalo's infringing sumps made use of the patented features in its sumps; and that Buffalo sold only one model of tank sump. Therefore, the court reasoned, Buffalo would have been willing to pay a high royalty so that it could continue to stay in business. 1995 U.S. Dist. LEXIS at **39-40.

In *Total Containment, Inc. v. Environ Products, Inc.*, 921 F. Supp. 1355 (E.D. Pa. 1995), the court awarded 21% of gross sales as a reasonable royalty for one of the same patents at issue in *Buffalo Environmental*. TCI argued for 25% of gross sales as a reasonable royalty because TCI and EPI were direct competitors; TCI did not license the patents in order to maintain the exclusivity that allowed it to solely enjoy the gross margin it made on its own sales (45-50%); and the sale of sumps promoted the sales of other high margin products. EPI proposed 10% as a reasonable royalty because EPI's incremental profit on its sump business was 35%; the normal starting point for allocating a license royalty was 25% of the available profit, [6] or 8.75%; and this figure was adjusted upward to 10% to account for the fact that EPI would be licensing a direct competitor and that the sale of sumps promoted the sale of accessories.

EPI also relied on two licenses involving another patent jointly owned by TCI and Exxon where Exxon granted TCI exclusive rights to sell the product to the market at large in exchange for a royalty of 3% of gross sales. Buffalo Environmental Products won the rights to this invention in an interference proceeding and as part of a settlement, Buffalo and TCI negotiated an agreement whereby TCI paid Buffalo a 3% royalty. The court held that the Exxon/TCI license was not probative because it did not involve an arm's length negotiation between competitors and that the TCI/Buffalo license was not probative because settlement-induced royalty agreements are determined largely by factors that are not considered in the hypothetical royalty negotiation analysis and are, therefore, not an accurate measure of a reasonable royalty.

[6] To the extent the court was implicitly relying on the 25 percent rule, see discussion of Federal Circuit's recent rejection of the 25 percent rule in *Uniloc*, n.3, *supra*.

The court found that EPI's suggested 10% royalty rate was inadequate because of the sales of collateral unpatented items promoted by the patented device. TCI profits on accessories were about $ 35/sump in 1991 and 1992. Assuming an average sump price of $ 400 and a gross margin of 45%, TCI would make about $ 180 from the sale of the sump alone. Sale of accessories would increase this to $ 205, an increase of nearly 20%. The court found that TCI would have demanded an additional 2% royalty in a hypothetical negotiation of the license agreement to recapture some its lost profit on accessories.

The court noted that when the patent issued and infringement began, EPI was in a very poor bargaining position because it was producing an infringing product. Although it needed time to redesign its product and have new molds produced, it had to continue selling sumps to remain in business. Further TCI and EPI were direct competitors and TCI did not license its sump patents. Under these circumstances, TCI could have demanded, and received, a very high royalty for a license. The court noted that although it was difficult, if not impossible, to evaluate these factors, because TCI might have been unwilling to grant a license regardless of the royalty offered, the court found that these factors would have added about 10% to the royalty received by TCI. Consequently, the court awarded a reasonable royalty of 21% of sales.

In *Minco, Inc. v. Combustion Engineering, Inc.*, 95 F.3d 1109 (Fed. Cir. 1996), the court awarded the patent holder a reasonable royalty of 20% of the gross value of applicable sales. The patent involved a more efficient way to manufacture higher quality fused silica, which is used in semiconductor technology. The Federal Circuit upheld the district court's review of the following evidence supporting a 20% royalty rate: (1) Minco and Combustion Engineering ("CE") were direct competitors; (2) CE had an inferior product at the time of infringement; (3) there were no non-infringing alternatives; (4) CE regarded the invention as a significant advance; (5) the industry enjoyed high rates of profit (CE realized an earnings before interest and taxes rate of 22.4% of sales after selling an infringing product); and (6) CE's earnings before taxes increased significantly after use of the accused products. *Id*. at 1119-1120. Further, the Federal Circuit affirmed the district court's 20% royalty rate award on CE sales beyond 95% of Minco's manufacturing capacity from May 1988 through July 1990 and on CE sales from 1986 through April 1988 when CE produced a blended fused silica.

In *Insituform Techs., Inc. v. Cat Contracting, Inc.*, 518 F. Supp. 2d 876 (S.D. Tex. 2007), the court awarded the patentee a reasonable royalty rate of 15.28% for infringement of a patent relating to a method of pipe rehabilitation where existing underground damaged drainage pipes could be repaired without removing the damaged pipe from the ground. The court reached this figure by subtracting 9.72%, the infringer's actual reasonable profit, from 25%, gleaned from expert testimony on the anticipated gross profit at the time of the hypothetical negotiated contract. *Id.* at 892. After calculating the 15.28% royalty rate, the court applied it to the value of Defendants' contracting jobs using the accused method both within a defined geographical area serviced by the patent owner and contracting jobs outside of that area. *Id*.

It is important to note that, as illustrated by the cases discussed herein, patent owners must introduce sufficient evidence for courts to determine a reasonable royalty

rate. In *Keg Technologies, Inc. v. Laimer*, 436 F. Supp. 2d 1364 (N.D. Ga. 2006), the patents at issue described hydrodynamic tools for cleaning pipes and channels that provided for increased water flow efficiency through improved fluid mechanics as water passes through a nozzle, which reduces water consumption and operating costs for customers. *Id.* at 1369. The district court denied Keg Technologies a reasonable royalty award because the court concluded that Keg Technologies failed to develop a record that provided an understanding of Defendants' profit margin on the sale of their products in a market where available non-infringing alternatives were ubiquitous. *Id.* at 1370. The district court explained that although courts have considerable discretion when determining reasonable royalty rates, it would be inappropriate to select a rate that was purely the result of arbitrary speculation. *Id.*

V. Conclusion

When there is an insufficient number of arms-length licensing agreements to set an established royalty rate, courts have effectively applied the other *Georgia-Pacific* factors to set a royalty in cases involving green technology. In the more recent cases discussed above, the courts concluded that royalty rates on either a percentage of cost savings or a percentage of gross sales were appropriate for the green technology at issue. Specifically, in the cases discussed above, the courts concluded that royalty rates of 33% (*Hanson* – snow making) and 25% (*Joy Technologies* – flue gas desulfurization) of cost savings and 20% (*Water Techs.* – water disinfectant; *Minco* – fused silica), 10% (*Buffalo Environmental* – sumps), 15.28% (*Insituform* – pipe rehabilitation) and 21% (*Environ Products* – sumps) of gross sales, were appropriate for the green technology at issue. Also, in the case of *Paice* (hybrid vehicles), the court concluded that a flat dollar amount of $25 per hybrid vehicle for the past and $98 per hybrid vehicle for the future based on defendant's profit was an appropriate royalty. The older cases that pre-date *Georgia-Pacific* employ *ad hoc* approaches, which, while interesting from a historical perspective, are probably unpersuasive for future use.[7]

While there is currently a somewhat limited number of publicly available license agreements and cases that analyze the appropriate royalty for green technology, this may change in the near future given the rapid growth of this area of technology.

[7] Additionally, the reader should use caution in applying any case that may have explicitly or implicitly relied on the 25 percent rule of thumb, as that rule has been rejected by the Federal Circuit. While customary profit splits may still be relied on in applying *Georgia-Pacific* factor 12, evidence applying that factor "must be tied to the relevant facts and circumstances of the particular case at issue and the hypothetical negotiations that would have taken place in light of those facts and circumstances at the relevant time." *Uniloc*, 2011 U.S. App. LEXIS 11 at **64-65.