Intellectual Property Valuation

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I. Overview

This white paper is meant to provide an overview of various aspects of intellectual property ("IP") valuation in the context of extracting value from such assets. Similarly, it is not meant to be a comprehensive and detailed study of IP value extraction and IP valuation issues. For those who are interested in learning more about IP valuation, there are many books that provide a more detailed discussion of the issues covered by this white paper. For further information regarding IP valuation, we refer you to the following books, which only represent some of the many resources available on this topic:

- Anson, Weston, *Fundamentals of Intellectual Property Valuation: A Primer for Identifying and Determining Value* (Chicago, IL: The American Bar Association), 2005.
- Cohen, Jeffrey A, *Intangible Assets: Valuation and Economic Benefit* (Hoboken, NY: Wiley), 2002.
- Pelligrino, Mike, *BVR's Guide to Intellectual Property Valuation*, 2nd ed. (Portland, OR: Business Valuation Resources, L.L.C.), 2012
- Razgaitis, Richard, *Valuation and Dealmaking of Technology-Based Intellectual Property: Principles, Methods, and Tools* (Hoboken, NJ: Wiley), 2009.
- Reilly, Robert F., and Robert P. Schweihs, *Valuing Intangible Assets* (New York, NY: McGraw-Hill), 1999.
- Smith, Gordon V., and Russell L. Parr, *Valuation of Intellectual Property and Intangible Assets*, 3rd ed., Cumulative Supplement (New York: Wiley), 2004.

II. A Framework for Considering Intellectual Property Value Extraction Efforts

One of the most attractive and potentially profitable aspects of IP assets is that they are highly leverageable and exploitable. Each intellectual property asset or group of related assets can be considered to have a "spectrum of value" associated with it which is made up of the collection of individual potential internal and external value extraction opportunities associated with the asset. "Value extraction" of IP assets simply relates to the various strategies and methods an intellectual asset owner may use to realize and maximize various aspects of the spectrum of value. Each individual opportunity can be considered a "slice" or "channel" in the spectrum of value.

For example, a certain engine-related patent can be used by the patent owner in the automotive industry to support the manufacture and sale of its cars. The same patent can concurrently be licensed to unrelated airplane, motorcycle, and boat manufactures for use in their products providing the patent owner with additional revenue streams resulting from the use of the same asset while not cannibalizing the patent owner's automotive engine sales. At the same time, the patent owner could evaluate the possibility of engaging in litigation with its automotive competitors for patent infringement to the extent they may be using the subject patent without a license. The collection of any relevant litigation damages or settlement revenues can be added to the patent owner's (1) revenues from internal use of the patent and (2) revenues from licensing the patent to companies in non-automotive industries.

Clearly, the "spectrum of value" concept is one that is unique to intellectual assets as most tangible assets such as plant and equipment are not as versatile (e.g., a machine on the production line can normally only produce one type of product at a time and can't simultaneously be leveraged to other geographies and fields of use). Of course, it is worth noting that many intellectual assets may have little or no value extraction opportunities despite the fact they can theoretically be leveraged and exploited in many different ways.

One framework that can be used when thinking about the various ways that value can be extracted from intellectual property is by considering whether each value extraction effort is focused internally or strategically on the intellectual property asset owner's operations or whether such efforts are focused externally through interaction with third-party organizations. By using this framework, each value extraction effort can be placed along a spectrum as follows:

Specific value extraction efforts briefly described and aligned across this spectrum are as follows:

A. Internal Value Extraction Efforts

Right to Exclude

Intellectual property assets provide an owner with a right to exclude others which may allow the owner to use technology or brands in, or with, their own products and services, which in turn may generate value (i.e., profits or cash flow) for the owner. However, it is important to remember that just because an organization owns intellectual property that it uses in, or with, one of its products or services does not necessarily allow the asset owner to manufacture and sell the product or service to the extent it relies on intellectual property assets owned by others. In these cases, true operating freedom as it relates to the product or service can only be obtained if third-party owned rights are licensed or otherwise obtained.

This right may have value as a competitive advantage to the asset owner by allowing it to go to market with a product or service that has valuable, protected features or functionality that its competitors cannot match. Such value may provide the asset owner with an increase in market share (i.e., increased sales), decreased costs, and premium pricing that may lead to enhanced profit/cash flows.

New Product Development

Intellectual property owners have the ability to incorporate their intellectual property assets into their own products as they go to market in their chosen industries and markets. Similar to the right to exclude, value can be obtained by virtue of being the exclusive provider of a product or service incorporating a feature or associated with a brand protected by intellectual property.

Some portion of the profit/cash flows generated from new products that incorporate owned intellectual property assets are attributable to these assets.

Start-up/Spin-off

Companies with substantially valuable and market differentiating intellectual property can spin the assets off into a separate company and implement a business model to extract such value. The benefit of incorporating very valuable intellectual property into a separate company may be to allow investors or potential investors to more clearly understand the value of the intellectual property after it is separated from the "noise" of the various other assets owned by the original asset owner.

Tax Strategies

Strategically, intellectual property assets can be used to reduce a company's taxes. Many companies have developed intellectual property management companies (or intellectual property holding companies) in jurisdictions with relatively low tax rates. These companies transfer most or all of their intellectual property assets to the new management/ holding companies and then license the assets back to those legal entities that use the assets in their operations. The arm's length royalty rates/transfer prices that are set as part of this type of tax scheme allow the management holding/ company to earn licensing revenue in the lower tax jurisdictions thus lowering the company's overall tax burden. Similarly, certain expenses related to development of intellectual property receive special tax treatment, and assets donated to charity or non-profits may be tax deductible.

Reduction of Cost Issues

Intellectual property assets used within manufacturing processes, administrative functions, or other internal operating functions can save costs for the asset owner. Such costs savings provide value by translating to increased profit/cash flows and, in many instances, by providing competitive advantages to the asset owner.

B. Hybrid Value Extraction Efforts

Joint Ventures, Co-Development, and other Collaborative or Partnering Arrangements

Joint ventures, co-development agreements, and other collaborative or partnering arrangements are created to combine multiple technologies, business assets or other expertise to generate new products or enter into new markets. The parties to a collaborative agreement such as these may be from different markets, may be related as manufacturer and supplier, or may even be competitors. Intellectual property is often a driving force of such collaborations, and parties should enter into a formal written agreement that clearly spells out the ownership of brands and/or newly developed technology and the rights to use other's background technology. The value of intellectual property assets and other assets contributed to joint ventures, co-development efforts, or other collaborative or partnering arrangements will likely play an important role in determining how the collaborating parties agree to financial terms of the venture.

Supply Agreements
The interplay of intellectual property between a company and its supplier can be a tumultuous one. A supply agreement can ensure a company's access to certain intellectual property of its suppliers, and if carefully crafted, ensure continued access down the road. In some circumstances, a supply agreement can provide exclusive rights to important supplier technologies and/or brands and thereby provide a competitive advantage in the marketplace. For the supplier, the agreement is a means to control the permitted uses of its intellectual property by purchasers. Alternatively, purchasers may need its suppliers to utilize their intellectual property to manufacture and supply products or components. The value of intellectual property may influence other financial terms associated with these types of agreements.

Intellectual Property Pools
Intellectual Property pools generally involve multiple parties which cross-license intellectual property to each other within a specific technological or market space. Ideally, the collective whole of the combined intellectual property is worth more than the individual parts, and the pool must work together in licensing and enforcing the intellectual property. Likewise, the risks of using and enforcing the intellectual property can also be shared. An example of a particular type of intellectual property pool is a patent pool. Patent pools are encouraged by the Federal Trade Commission, but care must also be taken to avoid anti-trust violations.

Market Appeal
Intellectual property assets can be used to increase corporations' market appeal, which contributes to increased sales of products/services incorporating these assets. Companies that are able to tout unique and innovative features of a product/service that are intellectual property protected typically increase the market appeal of the product/service to potential customers.

C. External Value Extraction Efforts

Licensing-Out
An intellectual property license allows the licensor to generate revenue through another's exploitation of its intellectual property, while the licensor retains ownership of the assets. Licenses can be limited by exclusivity, territory, field of use, and activities allowable under the license, such as the rights to make, have made, use, sell, sub-license, import or export the technology or brands, and royalty structure. As noted above, outbound licenses can effectively provide extension into markets that are otherwise closed to the owner. Increasingly, the licensing of competitors can be an effective way to increase market share, generate cash flows, and drive demand for the protected technology and/or brands.

Cross-Licensing
Much like the intellectual property pools discussed above, cross-licensing is an effective way to reduce risk and improve the scope of technology and/or brands found in a company's products or services. Strategic intellectual property cross-licenses can be used to join forces against a mutual competitor and maintain or increase market share.

Sale/Auction
Unused or under-exploited intellectual property is often an ideal candidate for sale. While direct sales remain common, auctions are becoming a popular way to dispose of intangible assets, and may expand the universe of buyers and increase revenue from the sale. A company should not only audit its intellectual property to identify saleable assets, but also identify technological or brand gaps and areas for expansion. That is, the purchase of intellectual property can provide an avenue to new products and new markets without many of the costs in time and money necessary to perform in-house research and development or brand development. The sale of distressed assets through bankruptcy can be a cost effective way to purchase intellectual property while providing a monetary recovery to the original owner's creditors.

Litigation/Enforcement/Assertion
The value of intellectual property may only be as great as the owner's willingness to enforce its exclusive rights. Especially in markets with a low barrier to entry, or where products are easily copied (such as software or music), litigation is often an owner's only recourse. Monitoring and benchmarking the marketplace can be essential to maintaining a competitive advantage. Enforcement activities can drive revenue through large awards, and may also lead to effective licensing or cross-licensing of technology or brands.

D. Preliminary Considerations

Prior to assessing, choosing, and implementing the variety of value extraction efforts that are available for exploiting intellectual property assets, an owner of such assets needs to understand the portfolio of assets that he/she/it owns and how such assets are already used. To achieve this goal, intellectual property owners should venture to conduct an "intellectual property audit." Such an exercise may include all or portions of the following steps:

1. Identify intellectual property assets owned or licensed
This may be particularly easy for patents for at least two reasons. First, patents are issued by government agencies, which provide an accessible and definitive means for defining the breadth and scope of the right to exclude. Second, patents are organized in databases by the country-specific patent offices so they can more easily be identified by others outside of these offices. Identification of intellectual property assets may be more difficult for trademarks and copyrights, which may or may not be formally registered with a government office in a particular jurisdiction. Identifying potential trade secrets is probably the most difficult part of this step as most organizations typically don't keep a formal inventory record of trade secrets; and trade secrets can be difficult to even identify without investing a relatively significant amount of time interviewing employees to understand proprietary information, processes, technology, etc. that provide value to the organization.

2. Group and categorize intellectual property
Grouping and categorizing intellectual property is important because in many cases, value extraction efforts require the use of multiple assets, and this process will facilitate and enhance the value extraction process. For example, a U.S. patent should certainly be grouped with its non-U.S. counterparts (if any), but it should also be grouped and categorized with other complementary intellectual property assets to the extent such assets would typically be used

together to support value extraction. For example, one categorized group of assets might include (1) multiple U.S. patents that all relate to the same technology or product/service, (2) non-U.S. patent counterparts, (3) trade secrets associated with the implementation of the various patents, (4) the trademarks related to the product/services that incorporate the patents and related trade secrets, and (5) any trade secret or copyright protected information related to the use of the product/service such as process set up instructions or user manuals. This step of the intellectual property audit by its nature is facilitated by an effort to map a company's intellectual property assets to the products and services that it sells. If direct mapping to particular products is difficult, the intellectual property may be grouped by subject matter, by marketplace or by business units.

Once the intellectual property audit has been performed, an asset owner is well positioned to consider and assess the likely multiple value extraction opportunities available to it. Value extraction strategies and related tactics can then be efficiently and effectively developed and executed.

III. The Importance of Valuation in Intellectual Property Value Extraction

In each of the instances described in section 1.1, the goal will be to accurately determine the value of the IP in order to support the specific type of extraction or rationalize investment in the relevant assets. While it's possible to need to value IP for non-extraction efforts – such as for SOX requirements, financial reports, other regulatory/compliance purposes, or for pure curiosity – it is not the main interest of most companies as intellectual property assets are first and foremost developed with the goal of generating value for the asset owner. These other purposes for valuation are follow the creation and use of intellectual property as a value generator/enhancer.

An important aspect of intellectual property valuation is the amount of formality associated with the analysis and reporting that supports the valuation. Typically, valuations supporting transaction negotiations (whether for a license, joint venture formations, buy/sell transaction, etc.) or internal decision-making require little formality. These valuations can be performed by non-experts and may not require a report. In many instances, these types of value extraction activities benefit from being informed by a valuation analysis but the rigor used to perform such an analysis is at the discretion of the party or parties. However, valuations for tax purposes or litigation, as two examples, typically require the valuation be performed by a third-party valuation expert that would be expected to utilize formally recognized valuation procedures and document the valuation as part of a formal report that complies with commonly-accepted valuation standards (for example, the American Institute of Certified Public Accountants' Statement on Standards for Valuation Services, No. 1, "Valuation of a Business, Business Ownership Interest, Security, or Intangible Asset," June 2007.)

At its most basic, accurately valuing IP ensures you will not leave money on the table as part of a transaction, or fail to extract any value by undermining a transaction as a result of asking for too much. In addition, the majority of value extraction efforts are initially informed by and/or rely upon the perceived value of the subject IP. So getting the value at least in the right ballpark is critical to even getting some projects underway. For example, extracting value out of a specific

patent may be overlooked if it appears to offer low revenues in one industry, whereas a more accurate assessment may show a greater value if it can block an entire other industry.

The mistake some companies encounter in starting an extraction or monetization program is by first asking the question, "What is our IP worth?", or "Do we have any IP from which we can extract further revenues?" For the obvious family jewels, it may be relatively easy to come up with ideas for making additional profit off of them (e.g., licensing out a house mark to put on a complementary product line), but it is the not-so-obvious IP that can be more difficult to extract value (and is generally in greater need of justification for continuing to obtain and/or maintain.)

In either case, the process starts by first asking what type of assets do I have? This will help narrow down the types of extraction that are available. For example, extracting value from a trademark is entirely different than extracting value from a patent, which is different than technical know-how or trade secrets. And for those that are willing to delve into value derived indirectly and not based on the sale of a product or service (such internal cost reduction systems, litigation avoidance processes, patents obtained solely for future leverage, institutional assets, relationship values, etc.), a clear understanding of these assets is even more critical to getting your arms around how it benefits your organization and how it could be made to produce actual income.

The second question is what exactly is meant by "worth"? The answer will depend specifically on the business you are in and your competitive realities. And it is that context and meaning that should drive the type of valuation that is eventually viewed as most accurate. There is generally no "right answer"; there are only better or worse answers in terms of context.

The third question is "roughly what values are present?" For many cases, particularly pure patent or trademark license, a simple market analysis will suffice. Multiply the value of the size of the potential revenue by a reasonable royalty, then adjust for variables and risks (such as the possible need to litigate).

These informal initial steps are most efficiently done internally and with a heavy dose of input from the business side. This will ensure that the context of the valuation in the first instance at least matches the strategic initiatives of the company. Outside counsel and consultants can provide this service but it will require significant understanding of the company, how it makes a profit, it's long and short term goals, and how it compares with its main competitors. Afterward getting this far, the business should have a reasonable understanding of what opportunities are available, and can work to refine all portions of their analysis.

IV. Intellectual Property Valuation Basics

A. Valuation Purpose/Context

In any valuation analysis the context enables you to decide which is the most appropriate valuation technique to be used and, therefore, the purpose/context is an extremely important factor of value. The first and one of the most important steps in any valuation is to establish the overall context of the valuation. Why is a valuation being performed? Is it driven by legal

reasons, such as litigation or disputes? Is it business reasons, a potential acquisition or sale? Is it governmental reasons such as taxes? Who has asked for the valuation? Who currently owns the intellectual property? When are we valuing it and for what purpose? Is the intangible asset or assets being valued today for a prospective licensee? Or a prior date when a transaction occurred? Or in the future when an event will occur? Each of these scenarios will have an impact on value. And, most importantly, what intangible assets are we valuing? Are we valuing a single intangible asset or a collection of intangible assets? These questions must be answered before proceeding to the next step of selecting the valuation technique.

Because of the contextual nature of valuing intangible assets, it should only be done when there is a specific decision to be made. Time and conditions are constantly changing and as a result even when all the factors remain the same, the intangible asset value may or may not be the same at all times.

Typically, the worth of an intangible asset is more valuable to a successful entity in a relevant industry that has an immediate need to exploit it and may have complementary assets. The same intangible asset is likely to have less worth to a small entity in a non-related industry. This reflects the influence of factors such as strong market position, established distribution channels, technology knowledge and deep capital resources.

Another consideration of context is defining which intangible assets are included in the analysis. Is it a single asset or a collection of assets? While intellectual property assets such as patents, trademarks and copyrights are the focus; it is underlying and related intangible assets that can have a significant effect on value. For example, a technology-based collection might include patents, know-how, trade secrets, formulas, procedure documentation and agreements.

And finally, the context of use, which is the value of the intangible asset for a particular use. The context of use is most commonly used in a licensing scenario. The parties may identify specific market(s) and application(s) for the value of the licensing terms.

B. Standard of Value

The standard of value is the type of value being utilized for a valuation based on the context of the valuation. There are significant differences between the various standards of value (i.e., fair market value/arm's length standard, fair value, and investment value). Generally, the use of different standards of value will result in different determined values for the same asset(s).

<u>Fair Market Value/Arm's Length Standard</u>
Fair Market Value is a commonly used standard that characterizes a hypthetical transaction. It represents value and price of the asset(s) between a generic willing buyer and generic willng seller that have resonable understanding of all the facts, and neither is under compulsion to act. In other words, the parties are not forced or pressured to conduct the transaction. The Arm's Length Standard is defined in the same way as Fair Market Value but the terminology is specific to valuation for transfer pricing tax-related issues.

Fair Value
Fair Value is similar to Fair Market Value except the buyer and seller are two specific parties instead of two generic parties. Fair Value is commonly used in valuation of IP for financial reporting purposes.

Investment or Strategic Value
Another standard of value frequently used in valuation analysis is Investment (or Strategic) Value. This value to a particular investor based on individual investment requirements and expectations.[1] An important consideration when considering Investment (or Strategic Value) is strategic or synergistic value realized by combining complimentary assets or indirect benefits from intangible assets.

C. Premise of Value

The premise of value is an assumption that should be made as part of every IP valuation regarding the most likely set of transactional circumstances that may be applicable to the subject valuation. The two premises of value include going concern and liquidation.[2]

Going Concern
An IP asset can be valued as a going concern assuming that the asset is expected to continue to be used in the future. A going concern value assumes the intangible assets will be supported by the owner and, therefore, the value of the assets will be the greatest and can differ significantly from a company that is liquidating assets.

Liquidation
When an organization or a specific business area is in financial distress, business leadership may seek to sell off intangible assets quickly. Under these circumstances, the value would be deemed a liquidation value. Intangible asset liquidation value reflects the lowest worth and may occur in two forms, orderly and forced, which is a condition on how the assets are sold.

An ordinary liquidation scenario may be a business in a Chapter 11 bankruptcy reorganization, which is shedding assets or winding down a business unit at a controlled pace. This value scenario provides that the business has adequate time to get the greatest value under the circumstances. Alternatively, a forced liquidation typically take place when a business is in a Chapter 7 bankruptcy proceeding in which the operation is seized and the courts have forced the sale of assets to pay the creditors. This situation is equivalent to a "fire-sale."

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[1] Statement on Standards for Valuation Services No. 1, "Valuation of a Business, Business Ownership Interest, Security, or Intangible Asset," American Institute of Certified Public Accountants (AICPA) Consulting Services Executive Committee, 2007 ("SSVS1"), Appendix B: International Glossary of Business Valuation Terms.
[2] SSVS1, Appendix B: International Glossary of Business Valuation Terms.

D. Valuation Date

The valuation date is one of the key variables that will affect the value determination of a particular IP asset. The value of an IP asset at one date may be extremely different than the value of that same asset as of a different date due to changing facts and circumstances, available information, and estimate of future events related to the asset at the different dates. For example, the value of an IP asset that has not yet been commercialized will typically be much lower than the value of the same asset at a later date after cash flows have begun to be generated and future sales levels, pricing, profit margins, and other financial and economic aspects of the products that use the IP asset are better understood and, therefore, less risky. An IP valuation should properly incorporate all known and knowable facts regarding the asset being valued as of the selected valuation date. All IP valuations should include an "as of date" or valuation date clearly communicated to the users of the valuation.

E. Common Intellectual Property Valuation Approaches and Methodologies

Three approaches are typically considered in estimating the value of intellectual property assets. These three primary approaches are defined as follows:[3]

- Cost Approach: a general way of determining a value indication of an individual asset by quantifying the amount of money required to replace the future service capability of that asset.
- Market Approach: a general way of determining a value indication of a business, business ownership interest, security or intangible asset by using one or more methods that compare the subject to similar businesses, business ownership interests, securities or intangible assets that have been sold.
- Income Approach: a general way of determining a value indication of a business, business ownership interest, security or intangible asset using one or more methods that convert anticipated economic benefits into a present single amount.

1. Cost Approach

The premise of the Cost Approach is that no party involved in an arm's length transaction would be willing to pay more to use the asset than the cost to replace the asset. Examples of costs that would be considered when implementing a cost approach include research and development (labor, materials, overhead, etc.), testing and regulatory approval costs, fees for contracted outside services, patent protection costs, equipment and other capital investments, and opportunity costs of diverted resources, among others.

Costs used to implement this approach may be based on historical development costs of the actual asset being valued or may be based on projected costs to develop pan asset of similar utility. If costs utilized for the valuation are based on historical development costs of the actual

[3] SSVS1, Appendix B: International Glossary of Business Valuation Terms. In addition to adoption by the AICPA, these definitions have also been adopted by the American Institute of Certified Public Accountants, American Society of Appraisers, Canadian Institute of Chartered Business Valuators, National Association of Certified Valuation Analysts, and The Institute of Business Appraisers.

asset being valued, it is important to remember that such historical costs must be adjusted to recognize the fact that they are being incurred at a later point in time than when the original development costs were expended. For instance, adjustments for inflation and other market changes across time are typically necessary.

In certain circumstances, the cost approach is a poor proxy for value for intellectual property. For example, in many cases cost bears little relationship to value as it does not reflect the earnings potential of the subject asset. Similarly, while an asset buyer or licensee would not pay more than the cost of its next best alternative, it is not necessarily concerned with the amount of money that the asset owner spent to develop the asset as this cost does not reflect the future use of the asset buy the potential buyer/licensee. Further, a cost approaches assumes that an asset is "replaceable" with one of equivalent utility. However, particularly when dealing with intellectual property assets which in many cases, by definition, are unique, the concept of their being an equivalent asset is untenable. However, a cost approach may be particularly useful when valuing early stage intellectual property that produces little or no cash flows and where potential future cash flows are significantly risky.

2. Market Approach

The premise of the Market Approach is that no party involved in an arm's length transaction would be willing to pay more than other have paid for similar intellectual property assets. Many characteristics should be considered and accounted for when considering the issue of comparability, including, but not necessarily limited to: the nature of the asset being valued, the nature of the legal protections, market size and characteristics (e.g., number and nature of applications), growth outlook for the relevant applications/products/services, the relationship of the parties to the actual/hypothetical and comparable transactions including their bargaining positions, the terms of the relevant agreements, timing of the transaction, etc.

Value analysts are faced with certain challenges when attempting to utilize a market approach to value intellectual property assets. First, similar to one of the challenges with the cost approach, intellectual property assets are typically, by definition, unique. As such, no potential comparable assets and related transactions will typically be exact matches to the subject asset. Second, the terms and circumstances of two contractual agreements are rarely ever exactly alike. In many cases, adjustments must be made the "comparable" agreements to account for these differences. In addition, the details (including compensation paid) for most intellectual property-related transactions (whether they be sale or license transactions) are typically not publicly available. As such, there are very few good sources of comparables for implementing a market approach and even when information about potential comparables is available such information is incomplete or otherwise not fully understood.

3. Income Approach

The premise of the Income Approach is that an asset's value is derived from the expected future incremental income stream/cash flows/benefits attributable to the asset being valued. In addition, a buyer in an arm's length transaction would be willing to pay some portion of its expected economic gain from using the subject intellectual property.

There are three primary parameters associated with implementing an income approach: (1) the amount of the incremental cash flows attributable to the subject assets, (2) the duration and timing of the incremental cash flows, and (3) the risk associated with the realization of the future incremental cash flows. One of the most significant challenges associated with implementing an income approach is determining how to apportion the incremental cash flows associated with a product or service to the various assets that contribute to the generation of such cash flows including the intellectual property asset being valued and other assets that also contribute. For example, a product or service may utilize multiple patented technologies and a trademark, along with plant and equipment and other tangible assets, to produce incremental cash flows. In such circumstances, the valuation analyst must apportion the cash flows associated with the product or service to all of these assets in an effort to quantify the cash flows specifically attributable to the asset being valued.

The income approach is typically considered the most rigorous valuation approach given the need to develop a discounted cash flow model for the valuation. The use of multiple variables to develop such a financial model causes an income approach to typically be more complex than the other approaches and depending on what assumptions are used, valuation results using an income approach can be wildly different for the same asset being valued. The use of poor assumptions when implementing an income approach may lead to meaningless and inaccurate value determinations.

The income approach can be implemented through the use of various valuation "methods." A few of the more commonly-used methods include, but are not necessarily limited to: Excess Earnings, Relief from Royalty, Residual Income, and With and Without.

a. Income Approach – Excess Earnings Method

The premise of the Excess Earnings method is that an asset's value can be measured by the incremental earnings achieved by an intellectual property-protected product relative to an essentially identical but non-protected product. A good example of the use of an excess earnings approach would be in the context of valuing a trademark. In this example, a valuation analyst might compare the earnings from the trademarked product to the earnings from a competing generic product that provides the same utility as the trademarked product but does not benefit from the premium pricing associated with the trademark. The difference in the earnings of these two products, all else being equal, would be attributable to the trademark and the present value of such future earnings differential would represent the value of the trademark.

b. Income Approach – Relief from Royalty Method

The premise of the Relief from Royalty method is that an intellectual property asset's value can be measured by the amount that the asset's owner would pay in royalties if it did not own the asset, but instead licensed it from an unrelated third party. In theory, the present value of the royalties that the asset owner is "relieved" from paying as a result of owning the asset may be one indication of the value of the asset. The Relief from Royalty method importantly requires the determination of an appropriate royalty rate for use of the subject intellectual property asset, which can be estimated in a variety of ways including: (1) use of established royalties found in

licenses covering the subject asset, (2) use of a hypothetical negotiation construct assuming willing licensor and willing licensee (note that this is similar or the same to the hypothetical negotiation framework typically used by damages experts in patent litigation based on the assessment of the *Georgia-Pacific* factors), (3) analytical methods including profits split methods, and (4) various rules of thumb including industry royalty rates.

c. Income Approach – Residual Income Method

The premise of the Residual Income Method is that a business can be segregated into its component assets (plant and equipment, case, intellectual property assets, etc.) and that the value of a particular intellectual property assets can be derived by deducting the expected or normal return associated with each asset class from the business's overall return until the valuation analyst is left with a residual amount attributable to the asset being valued. This method is difficult and/or ineffective when the business as a whole is realizing a loss of income on operations and when the business that owns the subject asset is unable to specifically identify all of its intellectual property assets, many of which will not show up on the company's income statement. For many companies, identifying all relevant and valuable trade secrets is typically one very challenging aspect of this analysis.

d. Income Approach – With and Without Method

The premise of the With and Without method is to compare earnings of a product sold with and without the intellectual asset being valued (ideally in the same time period). For example, in certain circumstances, a company may sell a product with a patented feature as a premium product and another lesser version of the same product without the patented feature. To the extent the products are the same other than whether the patented feature is or is not included in the product, the difference in the earnings made on both products would contribute to a calculation of the value of the patented feature. One of the primary challenges with this approach is typically the availability of information as it is not necessarily common to find good product comparisons with and without a specific patented feature. Instead, typically, similar product often have many differences between them other than the specific patented feature that is of interest to the valuation analyst making relevant comparisons difficult.

A similar method to the With and Without method is the Before and After method, which, for example, has the valuation analyst compare a product sold without a patented feature prior to its commercial introduction to the same product with the patented feature after its commercial introduction. The difference between the Before and After and With and Without methods is usually the time period for when data is available. The With and Without method is typically implemented using data from sales of the two relevant products over the same period of time. Alternatively, the Before and After method by definition relies on products sold in different time periods necessitating adjustments to data obtained for the "before" period to account for inflation and potentially certain market-specific economic differences.

4. Hybrid Approaches

In addition to the three primary approaches, there are a variety of "hybrid" approaches that draw upon the concepts from two or all three primary approaches. For example, in certain applications, the Relief from Royalty method can be considered to represent a hybrid approach to intellectual property valuation because it may have both Income Approach and Market Approach characteristics. As described earlier, the Relief from Royalty method is primarily considered to be an Income Approach method in the sense that it is implemented by discounting future royalty savings to the valuation date. However, in certain implementations, the Relief from Royalty method also draws from Market Approach concepts. More specifically, the implementation of the Relief from Royalty method necessarily requires the determination of an appropriate royalty rate for the asset being valued, which, in many instances, is determined by relying on royalty rates charged in existing license agreements by owners of similar intellectual property assets.

5. Use of the Results of the Valuation Approaches and Methods

The results derived from the implementation of the various approaches and methods are characteristically evaluated based on their respective merits, on a case-by-case basis, to arrive at a final conclusion of value. The weight given to the available approaches and methods varies with the facts and circumstances of each valuation effort and the availability of appropriate data; however, the attempted application of and reliance on multiple approaches and methods is generally preferred over the reliance on a single approach or method. The valuation analyst should generally attempt to collect information that can be used to perform all three primary approaches and any relevant hybrid approaches, but may be limited to one or two approaches based on availability of data or as a result of the standards required by the context of the valuation (i.e., the context of the evaluation may strongly advise the use of and reliance on one particular approach; an example of this is the use of a market approach for various tax-related valuations).

6. Rules of Thumb

In addition to the implementation of the specific valuation approaches identified above, the value of a particular intellectual property asset can be estimated using various "Rules of Thumb." Rules of Thumb techniques use short-cuts to quickly estimate value. The downside of using Rules of Thumb to estimate values is that these techniques do not consider and incorporate the specific facts and circumstances associated with the particular assets that are being valued or the context of the valuation. As such, a value estimated using a Rule of Thumb may be directionally correct, but it also may be substantially different than the value that would be determined using a more rigorous approach. While Rules of Thumb are not necessarily the best tool to obtain an accurate valuation of any specific intellectual property asset, they are often used by valuation experts as reasonableness tests for the values estimated using the more traditional approaches.

Likely the most common Rule of Thumb used to value intellectual property assets is the "25 Percent Rule." Using the 25 Percent Rule, a royalty rate can be assigned to an asset equal to approximately 25 percent of the operating profit margin earned on the product that incorporates the intellectual property asset being valued. While many valuation experts and the U.S. Court of

Appeals for the Federal Circuit have diminished, or in the Court's case, rejected, reliance on the 25 Percent Rule, the rule is still commonly used by parties involved in licensing negotiations and also, potentially, as a reasonableness test to the three primary valuation approaches we've discussed herein.

F. Minimizing Risk in Intellectual Property Valuation

One of the most challenging issues associated with valuing intellectual property assets relates to identifying and accounting for what are often significant risks and uncertainty associated with the asset being valued. While issues of risk and uncertainty about the future use and status of the subject asset may affect the implementation of a Cost Approach or Market Approach to valuation, these issues are particularly central to the use of an Income Approach given the forward looking nature of this approach.

Technology-related intellectual property assets, often in the form of patents and/or trade secrets, can be considered to have three primary types of risk:

- Business/Financial Risks: these risks address the uncertainty related to business/financial issues and inputs associated with calculating future cash flows that would contribute to an Income Approach-based valuation. Correctly estimating future customer demand, supply constraints, pricing, market penetration/share, costs, profitability, and other relevant business/financial issues and input is often extremely challenging.
- Technology Risks: these risks address the probability that the underlying technology will work as envisioned once scaled for commercialization purposes and that it will remain competitively attractive (i.e., avoid becoming obsolete).
- Legal Risks: these risks address the validity and enforceability of the subject intellectual property, scope of claims, freedom to operate, along with the ability to detect infringers and enforce the relevant intellectual property rights. These risks also encompass the uncertainty that certain current or future laws and directives might affect the subject asset's commercial status.

Accounting for risk and uncertainty is particularly difficult in the very common situation when intellectual property assets are valued prior to any (or significant) commercialization success, i.e., when the assets are "early stage." Early stage intellectual property assets – and in some instances, more mature intellectual property assets – are inherently risky for a variety of reasons, including, but not limited to:

- Claims included in the patent applications may not survive to the issued patents
- Issued patents may prove to be invalid when challenged
- Trade secret protections are not guaranteed
- Successful completion of an in-process technology is not guaranteed
- Implementation of the subject technology into products and services may be difficult or impossible
- Manufacturing scale-up may not be technically viable
- Costs of research and development, product integration, and manufacturing scale-up may be much higher than anticipated, perhaps even prohibitively high

- Market success has not been convincingly proven and often cannot even be tested until late in the product development process
- Anticipated regulatory approvals may be delayed or denied
- Unanticipated safety and efficacy issues may arise related to the in-process or finished product
- Non-infringing alternatives to the subject assets or design-around options may be difficult to identify and assess
- Innovation may be moving at a rapid pace, causing the economic life of a particular technology to be unknown and, perhaps, short-lived

Risk and uncertainty associated with intellectual property assets can be addressed by the valuation analyst through a number of methods, including:

- Performing significant due diligence to identify, understand, and assess the various areas of risk and uncertainty
- When using an income approach, adjusting the discount rate used as part of a discounted cash flow ("DCF") model upward to reflect the identified and assessed risks[4]
- Using sensitivity analysis to understand the effect on value from changing certain variables
- Developing various scenarios (best, likely, worst case, etc.)
- Implementing decision-tree analysis
- Using Monte Carlo techniques and related software
- Using option pricing techniques

V. Developing and Improving In-House Intellectual Property Valuation

A. Considerations and Challenges

Regardless of where a company falls on the IP value extraction spectrum, all valuation efforts should begin with an internal IP valuation model. To facilitate the correct mindset for such a model, intellectual property should be viewed as a business tool, from which value may be extracted to benefit the company. This business tool should be an integral part of a company's business strategy for attaining its business goals. The value of this business tool is important to identify as companies look for ways to monetize or otherwise capitalize on the value of their IP. The challenges associated with developing an internal model to value IP are unique because of the intangible nature of IP assets. Developing models to value tangible assets often have a market value model readily associated therewith. For example, most valuation models of real estate focus on comparable properties and other market factors. Intellectual property valuation rarely has a direct comparable, and, as such, adds a level of challenge to the analysis.

[4] From our experience, and supported by various third parties, discount rates used in conjunction with discounted cash flow models for valuing early-stage, technology-based intellectual property asset commonly range from 20 percent to 75 percent (and sometimes higher). This is in stark contrast to discount rates used, for example, when valuing businesses, which typically reflect the subject business' weighted average cost of capital ("WACC"). Per Morningstar, as of December 31, 2012, the medium WACC for a sampling of 381 large-capitalization companies was 7.73 percent.

The challenges are additionally complicated by the global footprint of many companies and the geographic market expansion in many industries. An IP asset may have much greater value in the United States and European countries as compared to an emerging market. For example, a long-used United States trademark may hold much greater value in the U.S. as compared to an emerging market where the trademark has only recently been used. Companies must continue to examine ways to extract value and maximize the potential of their IP assets on a global scale and periodically monitor their portfolios to ensure proper protections are in place.

Another challenge is understanding the portfolio of assets owned by the company. To overcome this challenge, companies should attempt to conduct intellectual property audits of their portfolios, as further described previously in this paper. Such audits facilitate understanding of the company's portfolio and provide guidance on how those assets should be handled in the valuation context.

Companies must consider many factors when developing or examining their internal IP valuation models. For example, the cost to obtain and maintain the intellectual property portfolio is certainly one important factor. Another consideration is whether anyone would want to acquire or license their intellectual property assets. Companies may want to advantageously consider how to license a given technology without forfeiting market share to competitors.

The strength of the intellectual property should also receive consideration. For example, companies should consider whether the breadth of the coverage is sufficient to force competitors to use alternative, inferior designs. Another consideration is whether the intellectual property provides any leverage against a competitor, and, in effect, provides an insurance policy for the company against future lawsuits. This consideration may also assess the value provided by the intellectual property, e.g., is the strength of the intellectual property sufficient to justify the expense of obtaining and maintaining the intellectual property.

The value of intellectual property should also be compared with any commercial products affiliated with the patent. For example, comparison of the intellectual property value with profit margins, sales and marketing expenditures, market exclusivity, and brand recognition are all important comparisons. Tax considerations must also be recognized and intercompany transfers of technology are an ever-increasing consideration as companies globalize and share technology across borders.

All of these issues, and many others that relate specifically to the three primary valuation approaches defined and described earlier – Income, Market, and Cost – must be incorporated into the valuation process and models that an organization may wish to develop to support intellectual property valuation efforts.

B. Process

To maximize the value extracted from intellectual property, it is essential to begin with a solid foundation. At the heart of the foundation are inventions developed by the company. These inventions provide the baseline in the process of identifying value.

Once inventions are identified, the company should aggressively and proactively seek to protect the inventions via patents, trade secrets, copyrights, trademarks, or other forms of intellectual property. The establishment of this protection allows companies to rigorously evaluate the various forms of intellectual property. Without this establishment and identification of the intellectual property protection, a company will likely be unsuccessful in establishing a value for their intellectual property.

The process continues by identifying a value for each component of the intellectual property portfolio. In the context of the value approaches and methodologies discussed in other parts of this paper, the factors discussed in the previous section should be considered in every situation. For example, commercial, market, IP cost, market exclusivity, and other factors should be the focus of this evaluation.

This valuation may be accomplished via periodic audits of the IP assets of a company. This valuation may also be completed in the context of a sale of the company, the merging of two companies, or the acquisition of a third party company. A finance or tax audit of a company's assets may also trigger this valuation process.

A great way for a company to stay abreast of the valuation of their IP is to establish and maintain a strategic IP management program which functions as the internal IP valuation and extraction resource, among other functions. An effective IP strategic management program enables business units to manage their own IP assets within the larger context of the company as a whole. This establishes an infrastructure to facilitate IP management and value extraction. This type of program also establishes executive management support for the IP valuation process, which is critical to its success.

Because the results of IP valuation are only as good as the inputs used to perform the valuation, a key feature of developing a successful process to support valuation is to be sure that due diligence steps are comprehensive. Companies should compile lists of potential due diligence points aligned by as many as three primary areas of consideration – business/financial, legal, and technical. Technical due diligence may be unnecessary as it relates to marketing assets such as trademarks but is integral for valuation of technology-based patents, trade secrets, and potentially certain copyrights, for example, related to software. Proper and comprehensive due diligence usually leads to accurate valuations which are reflective of the true value of the subject assets.

Another key feature of a successful valuation process is the implementation/use of multiple approaches to consider the value of the IP. Ideally, all three traditional valuation approaches – Income, Market, and Cost – should be explored and considered when performing a valuation. A valuation process that does not consider all three approaches may provide inaccurate perspectives on value.

C. Tools and Resources

There are many software tools on the market today offering ways to inventory and map a company's intellectual property assets, in addition to the readily available docketing software tools that allow a company to track and manage their IP portfolio. These inventories and maps

are useful tools to begin identifying the scope and value of the IP. However, such tools may only provide a solution for the first step in the process.

Depending upon which valuation approach is implemented, different tools and resources should be used or consulted.

For example, the use of the Income Approach should rely on a detailed discounted cash flow ("DCF") model. Organizations should likely develop and maintain DCF model templates that all relevant personnel can access and utilize. Such standardization increases the likelihood that valuations of different assets performed by different people have the same basis and are somewhat consistent. A key component of using a DCF model is the identification and use of an appropriate discount rate for discounting future cash flows to the date of the valuation. All personnel using a common DCF model at a particular organization should, as a best practice, be provided with the same guidance for selecting appropriate discount rates. This will also improve valuation results across multiple valuations performed by different people by making the valuations more consistent no matter who is performing the valuation. The selection of an appropriate discount rate is, at least in part, more art than science. Given that the subject of discount rates for IP valuation has been addressed itself by entire white papers, articles, and even books, it is beyond the scope of this whitepaper to provide in-depth guidance on specific rates that should or shouldn't be used in specific circumstances.

As another example, for purposes of performing a Market Approach, organizations are well advised to develop databases of royalty rates, other compensation terms, and other relevant terms, associated with all their in- and out-licensing agreements. Such a database is a rich source of information related to potential "comparables" that are at the heart of the successful use of the Market Approach. In addition, commercial databases such as RoyaltySource and ktMINE, among others, are useful tools for identifying comparables for a Market Approach analysis. Personnel with IP valuation responsibility should be familiar with these internal and external resources and should use them, as necessary, to support most IP valuation analyses.

D. Roles and Responsibilities

Internal IP valuation programs may include various roles and responsibilities to effectively manage and achieve the purpose. For example, a corporate IP asset manager may be the lead professional who is responsible for facilitating the success of the IP valuation extraction efforts and leading the execution of the intellectual property policies of the company. In a large company with many individual business units, business unit IP asset managers may also be appointed. Each business unit IP asset manager is responsible for managing the IP assets of their particular business unit including value assessments and value extraction initiatives. Corporate or outside IP counsel play critical roles in this process to provide insights and expertise on the value propositions established for various components of the IP portfolio. Also, IP counsel can provide expertise on how to expand the value of the portfolio and provide advice on the business impact of decisions related to the portfolio.

The question facing many organizations is what internal resources are needed to establish the internal IP valuation and extraction initiatives and who should have this responsibility. There is

no single correct answer as the culture and available resources/personnel of each particular organization typically influence the answer to this question. The range of resources extends from no dedicated resources to at least one full-time employee solely focused on such initiatives. This range may be exemplified in a spectrum ranging from each extreme. Many large companies with extensive and well-established IP portfolios will fall on the far right of this spectrum, in which one or more full-time employees are solely dedicated to this role. Some smaller companies with growing or less-mature IP portfolios will fall toward the left of this spectrum, in which perhaps only one employee dedicates a portion of their time to such initiatives. Still other companies will not have any dedicated internal resources, and instead will use an outside law firm or consulting firm to function in this capacity. Depending on the level of available resources and the commitment of the company, some organizations may establish a "Center of Excellence" or some other central function where true IP valuation expertise can be developed as a skill set for a select group of internal "experts."

E. Training

1. External Certifications and Organizations

When identifying strategies and methodologies to facilitate IP validation initiatives, there are many external organizations which specialize in business valuation and many of these entities also offer services related to intangible asset valuation. When considering outside consulting resources, there are at least four different organizations that certify business valuation appraisers including the American Society of Appraisers (ASA) (www.appraisers.org), the American Institute of CPAs (AICPA) (www.aicpa.org), the National Association of Certified Valuators and Analysts (NACVA) (www.nacva.com), and the Institute of Business Appraisers (IBA) (www.go-iba.org). Some of these external certification organizations offer special credentials for business valuation professionals, such as the Accredited in Business Valuation (ABV) credential offered by the AICPA.

Many institutions of higher education also offer certification and/or education programs and designations for business valuation, such as patent and intangible asset valuation analyst designations and certifications.

2. Internal training

The world of intellectual property is often challenging and confusing. Patents, trademarks, copyrights, trade secrets, and other intellectual property are the subject of many laws and regulations. When adding the complexity of then trying to value that intellectual property, the IP world becomes even more confusing and challenging. Many companies may acknowledge the need to undertake an IP valuation, but forego the challenge due to the complexity and uncertainty. At the outset, it is crucial for all relevant employees to have proper training and education regarding intellectual property matters. Intellectual property issues are present in every facet of business and employees must be able to recognize these issues. The intellectual property law department in cooperation with valuation experts may provide training to internal employees on valuation topics. These valuation experts may be internal personnel, such as CPAs or others who have received external training in these areas. This training will help employees

recognize issues and situations where intellectual property protection and enforcement is important and where value may be extracted for the company.

VI. The Effect of the American Invents Act on Intellectual Property Valuation

The recent passage of the America Invents Act ("AIA") has made major changes to the patent system. Although these changes are understood to make substantial changes to the patent process, they also raise issues that may affect the valuation of a company's IP assets. Given that the provisions of the AIA first went into effect on March 16, 2013, at the time of the writing of this white paper, it was still somewhat unclear how the AIA will ultimately affect IP valuations. The following provides some preliminary, logical guidance regarding such potential effects, but the actual effects of the AIA on IP valuations will be better understood in the future once more practical experience is obtained.

First To File

Although issued patents are generally looked at as encompassing the value of a patent portfolio, pending applications may also have considerable value, especially for a newly-formed or start-up company or for nascent technology. Under the pre-AIA first-to-invent standard, there was always a risk that a third party application having an earlier invention date exists that would trump the invention date of an application under review. The risk becomes more difficult to assess because the third party application could be recently filed and thus not yet published or perhaps could even be an as-yet unfiled application. As a result, caution was needed in assigning a valuation to a pending patent application so that the risk that a third party may possess a superior, but as yet unknown, claim to the invention.

The first-to-file provisions of the AIA will make the valuation determination of published applications more certain. Because the rights to a patent will now be determined by the filing date of the application, the risk that a later filed third party application claiming superior rights to the invention have been minimized. For most cases, the question of ownership to an invention can be determined by a simple review of the filing dates of the respective applications. Moreover, because most patent applications do tend to be published, a search of published patent applications is more likely to locate any earlier-filed third party applications that provide a superior right to the invention.

Prior User Rights

The AIA provides a new incentive for companies to forego patent protection and instead rely on trade secret protection. The AIA grants owners of trade secrets with certain prior user rights that will now trump the preclusive effect of a later-filed third party patent. These prior user rights will encourage companies in certain industries to protect certain developments as trade secrets rather than published patents. In general, subject to other requirements, a company that can demonstrate that it has been practicing a trade secret for more than a year before a third party patent application is filed will be able to continue to practice that process regardless of whether the third party application issues as a patent. The existence of the prior user rights makes the preclusive effect of patents less certain, thereby reducing the certainty that a patent under review will be given universal preclusive effect. For instance, the value to a company of a patent for a chemical process is reduced to the extent that the company's leading competitor may possess

prior user rights that would allow it to practice the same process. Because the existence of the prior user rights is generally unknown until a challenge is made, patent valuations will generally be reduced to account for this risk.

Increased PTO Fees

The AIA included steep Patent Office cost increases and it is anticipated that these costs will continue to increase over time. Moreover, the costs associated with certain new procedures such as inter partes review and post grant opposition are quite steep. As a result, patent costs have increased and are expected to continue to increase in the future and the most recent fee schedule shows such an increase especially as to maintenance fees. Because of the added cost associated with the maintenance of a patent portfolio, the value of the portfolio will be correspondingly decreased, particularly when relying on an Income Approach to value the subject patents.[5]

Post-Grant Challenges

Through post-patent issuance challenges such as inter partes reviews and post-grant oppositions, the AIA has established a framework that will enhance the certainty of the scope and validity of patent rights. These proceedings will allow a more definitive assessment of the strength and valuation of a patent. Accordingly, by instituting the office challenges of issued patents, the AIA will, in this regard, provide a better and more definitive valuation of challenged patents.

VII. Intellectual Property Valuation Case Study

Disclaimer

The following case study has been developed to provide insights regarding how a fictional company may approach certain intellectual property ("IP") valuation issues and opportunities in various contexts. The facts and circumstances provided in this case study have been made up by the authors and are not intended to represent any actual companies or valuations. To the extent this fictional case study is similar to any actual companies or valuations is only a coincidence. In addition, please note that the approaches, methods, and analytic techniques referenced below and related to the various valuations covered by this case study are only illustrative and are not meant to be comprehensive considerations of all relevant data and analyses that could be considered and performed in any specific instance.

Case Study Summary

This case study explores the value of an IP portfolio (including patents, patent applications, and trade secrets) owned by a fictional company that develops and manufactures specialty glass that is protected by an IP portfolio. The case study explores the value of the company's IP portfolio across six different specific valuations across various contexts including:

- The use of the IP portfolio as collateral for financing;
- The use of the technology covered by the IP portfolio by the portfolio owner for the development and commercialization of a product;
- The investment of venture capital in the IP portfolio owner based in large part on the value of the IP portfolio;

[5] Alternatively, using a Cost Approach to value patents, the higher maintenance costs associated with the AIA would likely cause an increase in patent value.

- The licensing of the IP portfolio at first narrowly and eventually very broadly; and
- The use of the IP portfolio to reduce the company's tax liability.

The case study explores how various issues associated with IP valuation affect value in these contexts, including:

- The make-up of the IP portfolio including number of assets and scope of claims;
- Valuation purposes/contexts;
- Valuation approaches, methodologies, and analytic approaches relied upon;
- Assessment and quantification of risk and uncertainty associated with the IP portfolio and any future potential cash flows it may be credited for generating;
- Appropriate standards of value; and
- Timing of the valuation (i.e., the dates as of which the valuations are performed)

Introduction and Background

In Year 1, GlassCo, Inc. ("GlassCo") was established and based in the state of Illinois in the United States ("U.S."). The company was started as a spin-off out of State University where university researchers developed a type of glass ("HGlass") that was substantially harder (i.e., more difficult to break) than any other known glass at the time. Early research also indicated that this glass could be made to (1) be exceptionally thin (while retaining its characteristic hardness), (2) be shatterproof, and (3) provide almost no glare when viewed in extremely bright light. The entrepreneurs that created GlassCo saw a variety of potential profitable applications for HGlass across many industries but were initially focused on supplying glass for the large and expanding smartphone market where broken and shattered displays were an increasing problem for consumers.

While early prototypes of HGlass showed great promise for the technology, GlassCo spent Years 1 and 2 performing additional research and development in an effort to refine the technology and develop a product that could be incorporated into smartphones. By the end of Year 2, GlassCo had been granted three U.S. patents, two European patents, one Canadian patent, one Chinese patent, one Japanese patent, and had filed several patent applications in each of these jurisdictions relating to the most important features of HGlass. HGlass was additionally supported by various trade secrets primarily related to GlassCo's manufacturing process for HGlass and certain of the specific material inputs necessary to make HGlass that allowed GlassCo to further enhance the value of the patents and patent applications. (Going forward, GlassCo's patents, patent applications, and trade secrets, together, will be referred to as its "IP Portfolio.") GlassCo's operations over Year 1 were financed through personal funds of the owners and their families and friends. GlassCo did not generate any cash flows during Year 1.

Valuation #1

At the end of Year 1, GlassCo believed that it was a year away from having a technology that would be ready to be commercialized through incorporation into smartphones. However, GlassCo no longer had enough capital to complete the necessary research and development. GlassCo owners did not want to give up equity in their company so early in its life so, instead, they approached several banks to obtain debt financing. One bank was willing to provide debt financing to GlassCo contingent upon the requirement that GlassCo use its IP Portfolio as

collateral for the loan. GlassCo agreed to the collateral requirement and ventured to value its IP Portfolio as of December 31, Year 1.

Upon assessing the three traditional valuation approaches – Income, Market, and Cost – GlassCo was immediately challenged with how to properly value its IP Portfolio. GlassCo's primary considerations regarding each potential valuation approach were as follows:

The use of an Income Approach to value GlassCo's IP Portfolio suffered from a variety of challenges. For example, as of the date of the valuation, GlassCo did not have a history of cash flows or any concrete expectations of future cash flows upon which it could base projections of future cash flows attributable to the IP Portfolio. As such, GlassCo did not have any reasonable basis to perform an Income Approach to value the IP Portfolio. Even if GlassCo could have developed cash flow projections for use in an Income Approach, the risk of the future cash flows would probably be so high (given that GlassCo had never made a single sale and did not have any specific sales prospects) that the discount rate that it would have had to use to perform the calculations would have also been extremely high, thus causing future cash flows to have an extremely small present value as of the date of the valuation. For these reasons, an Income Approach could not reasonably be relied upon to value the IP Portfolio.

To investigate a Market Approach, GlassCo searched several commercial databases, books, and performed other research to attempt to identify transactions for technology comparable to that covered by its IP Portfolio. Ultimately, GlassCo could not identify any transactions for technology similar enough to be a reliable proxy. As a result, GlassCo was forced to abandon the use of a Market Approach to value its IP Portfolio.

Because of a lack of reliable data to utilize an Income Approach or Market Approach as described above, GlassCo recognized that a Cost Approach would likely provide the most accurate value of its IP Portfolio at this very early stage of the relevant technology and company. To quantify the cost necessary to replace the utility and benefits of its IP Portfolio, GlassCo started with its own experience to-date developing the IP Portfolio to act as a reasonable proxy. GlassCo gathered a variety of costs for this exercise, including:

- An estimate of the cost of its historical research and development activities including inventors' time and salaries, materials, machinery and equipment, other capital investments, third-party services, etc., and
- Patenting costs including legal fees and prosecution and maintenance fees paid to the USPTO and patent offices in other countries.

These relevant historical costs were then adjusted to reflect current cost amounts as of the valuation date. Finally, these adjusted cost amounts were slightly discounted to account for the fact that one who wished to replace the utility and benefits of IP Portfolio would likely be able to do it for a lower cost than the amount expended by GlassCo because GlassCo's public disclosures through its patents and published patent applications would provide certain best practices helpful to the development of an alternative, comparable technology.

It was determined that the appropriate standard of value for this valuation was Fair Market Value given that the value the bank would be interested in understanding was the value between a generic willing buyer and a generic willing seller and not the value between two specific entities.

As a result of Valuation #1, the IP Portfolio was valued to be worth $3 million. Based upon this valuation, the bank provided GlassCo with enough capital to complete its research and development in Year 2.

Valuation #2

By the end of Year 2, GlassCo had been granted additional patents and had applied for additional patents across the jurisdictions in which it already had patents. In addition, GlassCo believed that its HGlass was ready to be commercialized. At the beginning of Year 3, it entered into a contract to provide HGlass to smartphone manufacturer SmartCo, Inc. ("SmartCo") for use in a new high-end smartphone. Under this contract, GlassCo was to provide SmartCo with HGlass for one million devices in Year 3 to be delivered to a single U.S. manufacturing location of SmartCo's. SmartCo did not commit to purchases beyond Year 3. To finance the capital investments and operations necessary to meet the contract's demands, GlassCo approached the bank that had given it a loan based on the valuation of the IP Portfolio as part of Valuation #1 and requested an additional loan using the value of the IP Portfolio as collateral. The bank requested a second valuation of the IP Portfolio and committed to a loan to GlassCo for an amount equal to as much as the difference between the updated value and the loan amount that resulted from Valuation #1.

To determine the value of the IP Portfolio as of January 1, Year 3 (almost exactly one year after the valuation date used for Valuation #1), GlassCo reconsidered each of the three common valuation approaches – Income, Market, and Cost. Similar to Valuation #1, for Valuation #2 the Market Approach continued to be unusable due to a lack of data on comparable transactions. However, unlike with Valuation #1, the use of Income Approach instead of reliance on a Cost Approach became tenable for Valuation #2. This was primarily because as of the Valuation #2 valuation date, GlassCo could reasonably forecast future cash flows given the contract it signed with SmartCo unlike at the valuation date for Valuation #1 when future cash flows were not yet foreseeable with any certainty. Once cash flows become foreseeable, the use and reliance on an Income Approach typically provides a more accurate assessment of value than a Cost Approach, which by its nature is disconnected from the IP Portfolio's potential future cash flow generation. Once again, for the same reasons as articulated for Valuation #1, Valuation #2 was performed using a Fair Market Value standard.

Some of the primary considerations and assumptions that were considered as part of Valuation #2 included the following:

- When implementing an Income Approach for Valuation #2, the contractually guaranteed cash flows for Year 3 associated with the SmartCo contract were discounted back to the valuation date using a relatively low discount rate given that the risk of the cash flows is relatively low because they are contractually guaranteed. Of course, even these contractually guarantees have some measurable amount of risk for a variety of reasons including, for instance, without an operating history GlassCo may not be able to fulfill

the contract due to manufacturing, technical, distribution, or other challenges that have not yet been identified.

- Although GlassCo has no guaranteed sales to SmartCo after Year 3, some level of sales to SmartCo in Year 4 and beyond were modeled as part of the Income Approach valuation. However, because such sales are not part of the contract and are, therefore, significantly more risky than the Year 3 sales, cash flows related to potential SmartCo sales in Year 4 and beyond were discounted back to the valuation date using a significantly higher discount rate than the rate used for the Year 3 SmartCo sales as described above.
- Without relationships with any companies other than SmartCo, potential future sales to other companies, which feasibly could have been included in the model, were not specifically forecasted. Even if such sales had been included in the calculation, the discount rate that would have been used would have been extremely high (even higher than the post-Year 3 SmartCo-related cash flows) and, therefore, their effect on value may have likely been immaterial anyway.
- The cash flows modeled for the Income Approach relate to sales made of HGlass product to SmartCo. However, the cash flows associated with such sales are the result of the use of the technology covered by the IP Portfolio <u>and also</u> other contributors of value that should be attributed some credit for producing the HGlass sales. For example, incremental capital equipment used to manufacture HGlass, the contract with SmartCo, and potentially other assets should appropriately be given some credit for the generation of HGlass-related cash flows. As such, the cash flows resulting from sales of HGlass were appropriately apportioned to the IP Portfolio and also other contributing assets. Ultimately, only 60% of the HGlass incremental cash flows were attributed to the IP Portfolio as part of the Income Approach calculations.
- A thorough study of the competitive market and patent landscape yielded the identification of many potentially competitive glass-related technologies but all were assessed to be inferior to HGlass. As such the valuation was not significantly affected by the existence of potentially acceptable non-infringing alternatives.

As a result of Valuation #2, the IP Portfolio was valued to be worth $7 million. Based upon this valuation, the bank provided GlassCo with enough capital to fund its operations and capital investments in Year 3. The increased value of the IP Portfolio from Valuation #1 and Valuation #2 also implicitly recognizes the fact that the IP Portfolio has grown in size (i.e., the number of assets in the portfolio has increased).

<u>Valuation #3</u>

The HGlass product roll-out in Year 3 to SmartCo was extremely successful and at the end of Year 3, SmartCo decided to use HGlass on all of its phones and tablets. The two companies signed an exclusive five year contract with minimum sales of 10 million units per year. The contract did not allow GlassCo to sell HGlass to any of SmartCo's competitors during the course of the contract and the contract related to GlassCo's global operations including the delivery of HGlass to multiple manufacturing facilities in the U.S., Mexico, China, and Europe. Once again, GlassCo found that it needed substantial capital to meet SmartCo's supply needs and looked to a venture capital firm VentureCo, Inc. ("VentureCo") to provide the necessary funding.

VentureCo saw GlassCo's IP Portfolio as its most valuable asset and, therefore, wanted to understand its value. VentureCo requested GlassCo work with it to value the IP Portfolio.

Similar to Valuation #2, Valuation #3 relied on an Income Approach given that the source of the value of the IP Portfolio was directly tied to cash flows generated from the HGlass product sales that utilize the technology covered by the IP Portfolio. Similar to Valuations #1 and #2, a Market Approach was still not feasible given a lack of available comparables. While a Cost Approach was feasible for Valuation #3, similar to Valuation #2 it was not relied upon as the cost to replace the IP Portfolio was no longer the best proxy of its value given that the assets were assisting to generate cash flows that produced a value significantly higher, and more relevant, than what would be generated from a Cost Approach.

When implementing the Income Approach for Valuation #3, the cash flows associated with the minimum 10 million units contractually agreed to between SmartCo and GlassCo were discounted with a relatively low discount rate given the contractual nature of the sales. In addition, the Income Approach discounted cash flow model included expected sales above 10 million units for the five year contract along with sales to SmartCo expected to be made after the end of the five year contract despite no contract in place related to such future sales. The relevant cash flows from these sales were discounted using a higher discount rate than the rate used for the contractually guaranteed minimum unit sales given that the risk of such cash flows was higher than for the guaranteed minimums. As with Valuation #2, only 50% of the cash flows associated with the HGlass sales were attributed to the IP Portfolio given that other assets owned by GlassCo contributed to the same sales. The competitive analysis performed during Valuation #2 was updated and it was determined that there were no significant changes to the competitive landscape that would cause any adjustment to the valuation to account for such a risk.

The standard of value for Valuation #3 was Fair Market Value, similar to Valuations #1 and #2 primarily because VentureCo is a financial investor and did not intend to use the IP Portfolio in a manner complimentary to its other holdings that might otherwise require the use of Investment Value.

As a result of Valuation #3, the IP Portfolio was valued at $40 million reflecting the substantially larger cash flows attributed to the IP Portfolio compared to in Valuation #2. This valuation informed VentureCo's investment in GlassCo.

Valuation #4

At the end of Year 6, three years into the current contract between GlassCo and SmartCo, GlassCo had been extremely successful through this supply relationship. GlassCo had been able to earn significant profits from the SmartCo contract and had paid off its two loans to the bank, which were supported by the IP Portfolio as collateral as described earlier when discussing Valuations #1 and #2. VentureCo was extremely happy with the return on its investment in GlassCo thus far.

Based on positive press associated with SmartCo's use of HGlass in its various consumer products, automotive supplier CarCo, Inc. ("CarCo") approached GlassCo to explore licensing

the IP Portfolio so that it may manufacture windshields and other glass elements (e.g., sunroofs, side windows, etc.) using HGlass for its automotive customers. CarCo wished to obtain an exclusive license to the IP Portfolio for all automotive applications. GlassCo agreed to enter into license negotiations with CarCo and ventured to value the IP Portfolio for purposes of informing those negotiations.

The standard of value necessary for Valuation #4 was Investment Value as it was important to understand the value of the IP Portfolio as it specifically related to CarCo's use of the IP (this provided insight into what CarCo was willing to pay for a license) along with the value of GlassCo's available alternative options other than entering into an exclusive license with CarCo (this provided insight into the value of GlassCo's next best alternative to the CarCo license) e.g., entering into an exclusive license with a larger competitor of CarCo may have yielded a greater value to GlassCo or entering into non-exclusive licenses with a variety of automotive suppliers may have been a more valuable alternative to GlassCo). Fair Market Value was an inappropriate standard of value in this circumstance because it only considers a generic willing buyer and generic willing seller, which did not reflect the purpose and use of this valuation exercise.

GlassCo performed a variety of analyses when evaluating the appropriate compensation to be paid for a license to the IP Portfolio, including the following:

- Performed an Income Approach analysis to determine the present value of future cash flows CarCo was expected to earn from the sale of the products and then apportion the cash flows to those attributable to the IP Portfolio versus other relevant assets (e.g., CarCo's brand/trademark, CarCo's established customer base and distribution channels, etc.). This amount can then be mathematically converted into a per unit or percentage running royalty and any necessary up-front and/or milestone lump sum payment.
- Considered CarCo's next best acceptable non-infringing alternative (i.e., determined the cost to create an acceptable non-infringing alternative, if possible). The incremental value to CarCo of using the technology covered by the IP Portfolio compared to its next best acceptable non-infringing alternative theoretically sets a ceiling on what CarCo would be willing to pay for the IP Portfolio for this particular transaction. In this case, CarCo's next best alternative was to use the same inferior glass in its products, which it had been doing in the past. The difference in the value of the HGlass technology compared to the next best acceptable available glass to CarCo provides a method for quantifying the price CarCo is willing to pay to license the IP Portfolio. From a theoretical perspective, CarCo is willing to license the IP Portfolio from GlassCo if it makes even one dollar more than its next best alternative after considering all revenues and costs. In practice however, CarCo still needs to make an appropriate return on its licensing investment.
- Consider GlassCo's next best alternative to entering into an exclusive license with CarCo. The value of this alternative theoretically sets a floor for what GlassCo would be willing to receive from CarCo for the license. In this case, GlassCo's next best alternative is to try to enter into an exclusive license with a competitor of CarCo's or to license the HGlass technology non-exclusively to the entire automotive industry.
- Consider royalty rates from potentially comparable technologies as part of a potential Market Approach by searching various publicly-available IP transaction databases such as RoyaltySource and ktMINE.

- Consider the *Georgia-Pacific* factors outlined in the seminal patent infringement case *Georgia Pacific Corp v. United States Plywood Corp.* This analysis is commonly used by damages experts in patent infringement litigation cases where the expert is attempting to determine an appropriate reasonable royalty in a hypothetical negotiation between the plaintiff and defendant.
- Potentially others

Analyses such as those listed above helped GlassCo to be an informed negotiator when negotiating the terms of the license agreement with CarCo. Ultimately, the actual value of the IP Portfolio in the context of this transaction was the amount of compensation agreed to by the parties. In this case, the parties ultimately agree that CarCo would pay GlassCo a running royalty of 5% of the net sales revenues earned from CarCo's sales of HGlass to its customers.

Development of Improved In-House IP Valuation Capabilities

At the end of Year 8, after two successful years of licensing the IP Portfolio to CarCo and continued success supplying HGlass to SmartCo, GlassCo recognized that there may be opportunities to supply HGlass or license the IP Portfolio to companies in industries other than handheld devices and automotive markets. For example, GlassCo saw opportunities to incorporate HGlass into products such as computer screens, television screens, residential and commercial windows, and potentially others. To explore and capitalize on these potential IP value extraction/monetization opportunities, GlassCo decided to develop more extensive in-house IP valuation capabilities.

Up to the present, IP valuation had primarily fallen to the employees at GlassCo who happened to be involved in the specific opportunities related to Valuations #1 through #4. Given the significant value of the IP Portfolio to GlassCo, it wished to formalize and enhance its IP valuation capabilities and resources.

After significant consideration, GlassCo decided to develop a small team of IP valuation specialists that would sit in its accounting and finance function and report up to its CFO. GlassCo made this decision for at least the following reasons:

- The GlassCo employees that had been involved in Valuations #1 through #4 primarily worked in the accounting and finance function.
- Expected future IP valuation needs were expected to be driven by the CFO as part of her responsibility for the value extraction and monetization opportunities related to the IP Portfolio.
- GlassCo considered providing training to many of its employees in its finance/accounting, research and development, and legal departments, all of whom might have a future need to value IP but instead decided that it would obtain better and more accurate IP valuation results if it developed a small team of IP valuation specialists that could assist all other employees with IP valuation needs as necessary. Essentially GlassCo decided to develop a "Center of Excellence" around IP valuation that would reside in its finance/accounting department.

GlassCo also decided to hire an IP valuation expert from outside of the company to lead its small IP valuation team, which was expected to include, in addition to the leader, four current

employees that would report to the team leader. The team leader would then report directly to the CFO.

Upon hiring an external IP valuation expert to lead its IP valuation effort, the following illustrative tasks were performed to develop the new "Center of Excellence"

- Four current employees were selected to be part of the new IP valuation team and the four employees were sent to receive training from a notable valuation industry organization. All four employees ultimately received a valuation certification.
- The IP valuation team developed standard discounted cash flow models to be used by the entire team for the implementation of Income Approaches so that new models did not have to be made from scratch for each valuation need.
- Guidance regarding appropriate discount rates for use in an Income Approach was developed by the team so that the quantification of risk and uncertainty associated with different valuations had a similar basis and was not left solely up to the discretion of the person leading the valuation.
- Due diligence check lists were developed to ensure that all valuation specialists were considering the same types of information when performing different IP valuations.
- A formal process for performing an IP valuation was developed to be sure that all relevant tasks were performed in a similar way by different members of the team. The formal process also informed employees outside of the IP valuation team of their responsibilities related to IP valuation. For example, in-house IP attorneys were tasked within the process to provide legal guidance related to assets being valued. Similarly, research and development personnel were tasked within the process to provide guidance regarding technical issues associated with the valuations. Also, sales and marketing personnel were tasked within the process to provide market insights and guidance.
- In anticipation of potential turnover within the IP valuation group or the expansion of the group over time, internal training materials were developed to help integrate new members of the team in the future.
- A formal repository of GlassCo and other potentially relevant third-party licenses was developed to assist with Market Approaches.
- A research and development expenditure tracking tool was developed to facilitate Cost Approaches.

<u>Development of IP Value Extraction/Monetization Strategies</u>

Using the processes and tools developed by the IP valuation team, the team next led the identification and vetting of potential value extraction/monetization opportunities related to the IP Valuation portfolio which had continually expanded over the years as more patents were applied for and granted and as more trade secrets were developed related to a variety of types of HGlass. The vetting of the potential opportunities to decide which should be pursued in what order consisted of serveral questions, the answer to many of which are drivers of value, such as:

- How should GlassCo prioritize different value extraction/monetization opportunities? What characteristics of the opportunity are most important to GlassCo: size, probability of success, time to cash flows, etc.?
- Which target applications generate the most annual sales?
- Which target applications have the highest profit margins?

- How important are the benefits associated with the IP Portfolio to the target applications?
- What target industries and companies are most open to change and innovation?
- Which target industries and companies are active licensees? At what rates do these industries and companies pay for IP licenses?
- Which industries are more consolidated or more fragmented than others?
- Should licensing generally be exclusive or non-exclusive, and what criteria will be used to decide this question on a case by case basis?
- What would be an appropriate range of potential royalty rates for different target applications?

Valuations #5 and #6

By the end of Year 12, GlassCo's value extraction/monetization efforts had been very successful. GlassCo now had 30 licenses across six different industries and was generating licensing royalties equal to approximately $120 million annually, and that amount was expected to continue to grow in the future. In addition, GlassCo's IP Portfolio had continued to expand and currently consisted of 50 granted patents and another 75 patent applications across the world. GlassCo's research and development budget was equal to $20 million per year. GlassCo also had developed operations in six different countries including its original U.S. headquarters.

At this time, GlassCo was advised by its tax accountants to consider developing an IP holding company that would own GlassCo's IP Portfolio. The new legal entity would be created in a low-tax jurisdiction and would license the IP Portfolio to all of the GlassCo subsidiaries and legal entities around the world. The effect of the holding company would be to shift income from higher-tax jurisdictions where the IP Portfolio is used to the low-tax jurisdiction in which the holding company operates through royalties that would be paid as a result of the inter-company licenses. To execute on this tax-reduction value extraction opportunity, GlassCo needed to perform two related valuations:

- Valuation #5: value the IP Portfolio for transfer from the GlassCo legal entities that currently own the assets to the holding company
- Valuation #6: develop intercompany royalty rates to facilitate the intercompany licenses between the holding company and all relevant GlassCo legal entities around the world

Valuation #5

The internal transfer of assets from a legal entity in one country to a related legal entity in a different company is typically a taxable event that requires a formal, third-party valuation subject to audit by the tax authorizes in one or both countries. The typically appropriate standard of value for such a transaction, as required by the U.S. Internal Revenue Service ("IRS") and similar tax authorities in other countries, is the Arm's-Length standard, which for all intents and purposes is equivalent to the Fair Market Value standard. Essentially the two related companies entering into the transaction should value the assets as if they were transacted between similarly situated unrelated parties – a willing buyer and a willing seller.

Taxing authorities, especially including the IRS, typically prefer the reliance on a Market Approach to valuing assets for tax/transfer pricing purposes to the extent possible. Given the significant number of licenses that GlassCo has entered into, the valuation of the IP Portfolio for

Valuation #5 was based primarily upon a hybrid Market/Income Approach using a Relief-from-Royalty methodology. Using the results of an analysis of royalty rates from GlassCo's 30 established licenses, a resulting reasonable royalty rate from this analysis was multiplied against expected revenues attributable to the future sales of products incorporating the technology covered by the IP Portfolio to calculate estimated future royalties the hypothetical willing seller would be relieved of paying by virtue of owning the IP Portfolio (alternatively, the same calculation can be considered an amount that the hypothetical willing buyer would have to pay to access the IP Portfolio). It is important to note that the royalty rates related to GlassCo's 30 established licenses were slightly different depending on the industry in which they were used (HGlass and the related technology and IP Portfolio had a different value when used in different applications) and that even within an industry royalty rates had decreased slightly over time to account for the fact that competitive glass technologies that were closer in value to HGlass (but not superior to HGlass) had been developed in recent years, causing the value of HGlass, and thus the royalty rate licensees were willing to pay for the IP Portfolio, to decrease over time.

The present value of this future stream of royalties as of the date of the valuation (i.e., the date of the transfer) was determined to be equal to the value of the IP Portfolio. As a result of Valuation #5, the IP Portfolio was valued to be worth $250 million.

Valuation #6

Similar to Valuation #5, the appropriate standard of value for Valuation #6 is the Arm's-Length standard and the valuation was performed by a third-party valuation expert that developed a formal valuation report to be submitted to relevant tax authorities, as necessary. As with Valuation #5, this tax/transfer pricing-related valuation to determine an appropriate arm's-length royalty rate for payment of inter-company royalties between (1) GlassCo legal entities that use the technology covered by the IP Portfolio and (2) the new IP holding company that now owns the IP as a result of the internal transfers facilitated by Valuation #5, was best performed using a Market Approach in line with taxing authorities preferences. As such, similar to Valuation #5, the intercompany arm's-length royalty determined for Valuation #6 was primarily based on a study and analysis of GlassCo's 30 license agreements related to the IP Portfolio. The result of Valuation #6 led to the use of a 6% intercompany royalty rate for transfer pricing purposes. It is important to note that given the similar nature of the two valuations including the fact that they relate to the same assets, are for similar purposes, use the same standards of value, and are performed at similar times, it was necessary to be sure that Valuations #5 and #6 were consistent in a variety of manners.

Conclusion

In this case study that explores the value of the IP Portfolio owned by GlassCo, the value of the IP Portfolio across six different specific valuations was affected by, and changed based upon, a variety of important inputs including, but not necessarily limited to:

- The make-up of the IP Portfolio including number of assets and scope of claims;
- Valuation purposes/contexts;
- Valuation approaches, methodologies, and analytic approaches relied upon;
- Assessment and quantification of risk and uncertainty associated with the IP Portfolio and any future potential cash flows it may be credited for generating;
- Appropriate standards of value; and

- Timing of the valuation (i.e., the dates as of which the valuations are performed)

As the size and scope of the IP Portfolio, along with the benefits (i.e., cash flows) generated by the use of the technology covered by the IP Portfolio, increased over time, and the risk and uncertainty associated with the IP Portfolio and its related future cash flows decreased over time, the value of the IP Portfolio increased in kind. Further, the benefits/cash flows associated with the IP Portfolio and the risks and uncertainty associated with the IP Portfolio and its related benefits/cash flows were driven, at least in part, by value extraction opportunities identified and realized by GlassCo, namely:

- The use of the IP Portfolio as collateral for financing;
- The use of the technology covered by the IP Portfolio for the development and commercialization of GlassCo's HGlass product;
- The investment of venture capital in GlassCo based in large part on the value of the IP Portfolio;
- The licensing of the IP Portfolio at first narrowly and eventually very broadly; and
- The use of the IP Portfolio to reduce GlassCo's tax liability.