

*Best Practices Discussion*

# Valuation of Intellectual Property as Part of the Asset-Based Approach

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*The asset-based approach is a generally accepted business valuation approach. This approach may be used to value either operating companies or asset-holding companies for transaction, taxation, financing, litigation, planning, and other purposes. The generally accepted asset-based approach valuation methods often involve the valuation of the operating company tangible assets and intangible assets. And, one common component of the intangible asset valuation process is the identification and valuation of the operating company's intellectual property. This discussion summarizes what valuation analysts (and their clients) need to know about valuing intellectual property as part of the application of an asset-based approach business valuation.*

## OVERVIEW

The asset-based approach is a generally accepted business valuation approach. The asset-based approach may be used by valuation analysts (“analysts”) to conclude the going-concern value of various types of operating companies—including industrial and commercial companies.

Analysts sometimes use the asset-based approach in conjunction with—or as confirmation of—income approach and market approach business valuation methods. And, analysts sometimes use the asset-based approach when income approach or market approach business valuation methods are not applicable (for example, due to data constraints).

There are various generally accepted valuation methods within the asset-based approach. Many of these methods involve the valuation of the intangible assets of the subject operating company. Intellectual property is one category of general commercial intangible assets. Most industrial or commercial companies own and operate at least some intellectual property.

This discussion summarizes what analysts (and their clients) need to know about the valuation of intellectual property as part of the application of the asset-based business valuation approach.

## INTELLECTUAL PROPERTY AS A SUBSET OF INTANGIBLE ASSETS

An intellectual property is an intangible asset that enjoys special legal recognition and legal protection. The special legal status of intellectual property comes from either federal statutes (for trademarks, patents, and copyrights) or state statutes (for trade secrets). Accordingly, intellectual property assets are a subset of general intangible assets.

There are four types of intellectual property:

- Patents
- Trademarks
- Copyrights
- Trade secrets

There may be other intangible assets that are associated with these intellectual property categories. For example, patents are often operated with—and transferred with—patent applications, unpatented proprietary technology, engineering drawings, schematics and diagrams, and other technical documentation. And, trademarks are often associated with—and transferred with—trade dress and advertising and promotional campaign materials.

## VALUATION DATA GATHERING AND DUE DILIGENCE

One of the procedures in the application of the asset-based approach is the due diligence process. Data gathering is one procedure in the analyst's valuation due diligence process.

There are several ways to categorize the documents that the analyst may gather. First, this discussion considers intellectual property documents from a time period perspective. If such documents are available, the analyst considers documents related to the historical operations, the current operations, and the expected future operations of the intellectual property.

Second, if such documents are available, the analyst considers documents from a functional perspective, including the following:

1. The development of the intellectual property
2. The owner/operator's current use of the intellectual property
3. A new owner/operator's potential use of the intellectual property

Third, if possible, the analyst collects and assesses data related to different competitive or strategic perspectives of the intellectual property. This competitive assessment considers the intellectual property's strategic strengths, weaknesses, opportunities, and threats ("SWOT"), including the intangible asset SWOT compared to the owner/operator's resources and limitations, guideline company benchmarks, and industry benchmarks.

The analyst performs reasonable due diligence efforts with regard to the intellectual property documents and data. In this due diligence, the analyst typically compares any intellectual property documents and data (particularly any prospective financial information) to the following:

1. Historical data regarding the intellectual property operations
2. Historical data regarding the owner/operator operations
3. Current resources or constraints regarding the owner/operator
4. Publicly available (and presumably objective) data regarding guideline intellectual property, guideline companies, and the subject industry

The analyst may ask the owner/operator to provide information regarding the economic benefits associated with the intellectual property. The ana-

lyst performs reasonable due diligence procedures related to such economic benefit information.

This caveat should not imply that the owner/operator will attempt to improperly influence the analyst's valuation opinion or to inflate or deflate the intellectual property economic benefits. The caveat only recognizes that the owner/operator is not a valuation analyst.

### Owner/Operator Data Gathering

If this information is available and relevant, the analyst typically requests information from the owner/operator with respect to the following:

1. The intellectual property development and maintenance
2. The owner/operator business operations (including the intellectual property)
3. The operations of the individual intellectual property

Sometimes, such owner/operator information is simply not available. It is not uncommon for the owner/operator to have created (or maintained) very few documents or data regarding the intellectual property. The analyst may be performing the valuation within a litigation or other contrarian environment. If the analyst is working for an opposing litigant, regulatory authority, taxing agency, or similar entity and not for the owner/operator, it may be difficult for the analyst to obtain all of the desired intellectual property information.

Typically, the analyst interviews the owner/operator regarding the intellectual property development process. The analyst may request descriptions of the following:

1. When the intellectual property was created
2. Why the intellectual property was created (that is, how the owner/operator functioned before the subject intellectual property was developed)
3. How the intellectual property was created (that is, what parties inside and outside the owner/operator entity) were involved in the development
4. The length of time associated with the intellectual property initial development and subsequent evolution (through the valuation date)
5. How the intellectual property evolved throughout its life cycle (for example, evolution due to continuing research and development investments, competition, obsolescence, or any other factors)

The analyst may also inquire about the maintenance of the intellectual property. This discussion may involve both maintenance expenditures and maintenance efforts. This information may be used in the assessment of the intellectual property remaining useful life (“RUL”).

The analyst may inquire about the owner/operator’s general business operations. These general business operations compose the environment in which the intellectual property actually operates. The analyst may request descriptions of the following:

1. How the intellectual property functions within the activities of the owner/operator
2. How the intellectual property contributes to the success of the owner/operator
3. How the subject intellectual property functions with respect to other intangible assets
4. How the subject intellectual property functions with respect to other tangible assets
5. What owner/operator employees use, maintain, protect, or commercialize the intellectual property

The analyst may inquire about the operation of the intellectual property within the owner/operator entity. The analyst may request responses to the following questions:

1. Does the intellectual property contribute to the generation of entity operating income?
2. Does the intellectual property contribute to the generation of entity ownership (royalty) income?
3. Has the owner/operator ever considered the inbound or outbound license of the intellectual property?
4. If it is not currently licensed, could the intellectual property be licensed?
5. Has the owner/operator ever been approached by a third party about an intellectual property sale, license, or other commercialization offer?

## Economic Benefit Data Gathering

The analyst may consider the economic benefits related to the intellectual property. These economic benefits may be considered from the perspective of the current owner/operator, another individual owner/operator, or “the market” in general (in other words, the population of hypothetical owner/operators). These economic benefits could include any or all of the following:

1. Some measure of operating income
2. Some measure of license income
3. Some protection of alternative income sources (such as through forbearance)
4. Some measure of risk reduction (such as through licenses, contracts, or other competitive advantages)
5. Some deferral or reduction of expenses, capital costs, or other investments.

The analyst may inquire as to how the owner/operator perceives the economic benefits of the intellectual property. This inquiry may include the following information:

1. The intellectual property historical benefits to the owner/operator
2. The intellectual property current benefits to the owner/operator
3. The intellectual property prospective benefits to the owner/operator.

The owner/operator is often in a knowledgeable position to identify and quantify these economic benefits. With respect to intellectual property benefits, the owner/operator typically does not prepare such documents and assemble such data in the normal course of business. Therefore, the analyst should perform reasonable due diligence procedures with regard to the intellectual property data provided by the owner/operator.

## Due Diligence Procedures for Owner/Operator Data

With regard to the historical benefits from the intellectual property ownership, the analyst typically compares such statements with the owner/operator’s historical financial statements. The claimed revenue increase, expense decrease, or other intellectual property economic benefit may be evident in the owner/operator’s historical results of operations.

The impact of the intellectual property can be encompassed in the current owner/operator’s financial statements. Whatever economic benefit is identified by the owner/operator (for example, increased product selling price or decreased operating expense) may be encompassed in the owner/operator results of operations.

For a newer intellectual property, the analyst may be able to compare current (with the intellectual property) financial statements to historical (without the intellectual property) financial statements. The economic benefit of the recently developed

intellectual property may be demonstrated by increased revenue growth, decreased expense ratios, and so forth, between the two periods.

The owner/operator may express the benefits in terms of financial or operational projections. Regardless of whether the subject is old or is recently developed, the owner/operator indicates the extent to which the intellectual property will contribute to the entity's operating results in the future. This economic contribution is converted into a value indication when the analyst performs a profit split, multiperiod excess earnings, capitalized excess earnings, or similar type of valuation analysis.

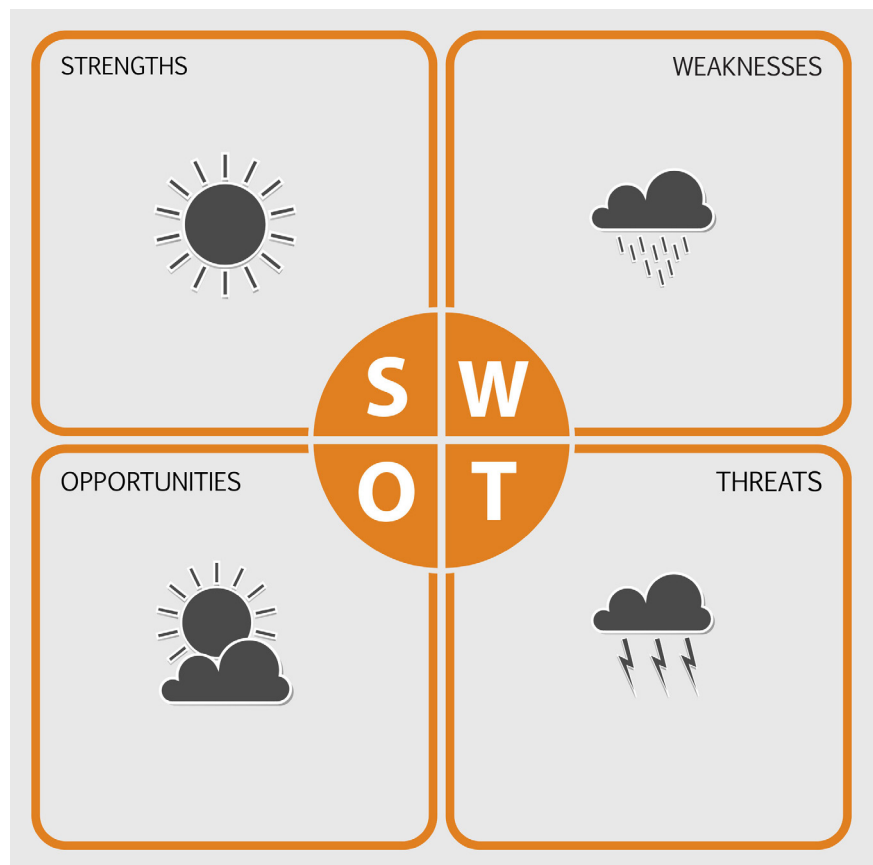
## Strategic and Competitive Analysis

Before selecting or performing the valuation methods, the analyst typically considers the competitive position of the intellectual property. This due diligence procedure often involves an assessment of the intellectual property SWOT. The SWOT assessment is performed by comparing the subject intellectual property to the corresponding intellectual property of the owner/operator's competitors. Typically, the analyst considers the SWOT position of the intellectual property within the SWOT position of the owner/operator entity.

At this stage of the valuation, the analyst can only consider general aspects of the intellectual property SWOT. More specific SWOT considerations may relate to the individual intellectual property types.

As part of data gathering and due diligence procedures, the analyst may consider the following questions with regard to the intellectual property SWOT:

1. How important is the intellectual property to the owner/operator entity?
2. What would the owner/operator entity do if the intellectual property did not exist?
3. Does the intellectual property protect the owner/operator from competition?
4. Is the intellectual property susceptible to infringement or other wrongful use?
5. Does the owner/operator adequately protect, improve, and commercialize the intellectual property?



6. Is the intellectual property primarily used to defend other assets or income sources?
7. Could the intellectual property be further commercialized (such as through licensing)?
8. Do the owner/operator's customers, stockholders, and other stakeholders perceive the value of the entity's intellectual property?
9. When practical, are the intellectual property safeguarded through contracts, non-disclosure agreements, noncompetition agreements, and documentation safekeeping practices?
10. Is the existence of the intellectual property sufficiently documented?
11. Is the intellectual property subject to obsolescence influences of any type?
12. What efforts are the owner/operator making to prolong the intellectual property RUL?

The analyst may consider these general competitive factors when assessing the reasonableness of the intellectual property economic benefits (and other data) provided by the owner/operator and selecting the appropriate valuation approach or approaches.

## Information Sources regarding Intellectual Property Sale and License Transactions

The application of the market approach and the associated valuation methods (for example, the comparable sales method and the relief from royalty method) are explained later in this discussion. Before considering the application of the market approach, the analyst often performs due diligence procedures related to guideline intellectual property sale or license transactions. In this due diligence process, the analyst assesses the existence of, and the volume of, such sale or license transactions.

At this stage of the valuation process, the analyst typically does not examine these data to select a comparable uncontrolled transaction (“CUT”). Rather, the analyst typically considers these data simply to see if there are any sale or license transactions of a type of intellectual property that:

1. may provide meaningful valuation guidance for the subject intellectual property and
2. are in the same (or similar) industry as the owner/operator.

In one respect, this procedure is related to the analyst’s strategic assessment of the intellectual property. If there is a fair amount of sale or license transactional data, that fact may mean that there is market interest in the intellectual property type. If there are little or no transactional data, that fact may mean that there is limited market interest in the intellectual property type. As with all due diligence procedures, the analyst should apply professional judgment.

The fact that there are few or no transactional data may mean that the intellectual property is an internal use only type of intangible asset or is the type of intellectual property that typically transacts with other tangible or intangible assets.

The due diligence procedures regarding sale or license transactional data may inform the analyst as to whether it is even possible to perform a market approach valuation analysis. If the market approach is practical, the analyst still has to select and analyze CUT data. Such valuation analysis procedures are typically performed after the due diligence process is complete.

## Valuation Analyst Due Diligence Inquiries

If these data are available and relevant, the analyst may investigate the following lines of inquiry:

1. The owner/operator operations before the development of the intellectual property
2. The owner/operator operations without the existence of the intellectual property
3. The competitors’ operations without the intellectual property
4. How the subject intellectual property is different from the competitors’ intellectual property
5. The intellectual property life cycle (at the owner/operator specifically or in the industry generally)

Depending on who the analyst is working for in the engagement, he or she may not have access to due diligence data sources related to the listed inquiries. The analyst’s due diligence questions may be affected by whether the intellectual property is an internal-use only intangible asset or an intellectual property that does (or could) generate operating or license income, or both.

If such access is available, the analyst may inquire as to how the owner/operator entity functioned before the development of the current version of the intellectual property. The analyst may consider the following questions:

1. Were there previous versions of the intellectual property?
2. When and how were the previous intellectual property versions created?
3. Did the intellectual property naturally evolve over time (like know-how or technical documentation) or are there discrete generations of the intellectual property (like a patent or license)?
4. Was there a time when the owner/operator did not have any version of the intellectual property?
5. What was the impact on the owner/operator entity of developing (or buying) the intellectual property?

The analyst may also inquire as to how the owner/operator entity would hypothetically function if it did not have access to the subject intellectual property. The analyst may consider the following questions:

1. Would the owner/operator buy or build a replacement intellectual property?
2. Could the owner/operator buy or build a replacement intellectual property?
3. How would the owner/operator replace the intellectual property?

4. Could the owner/operator function with the current version of the intellectual property?
5. Could the owner/operator function with any current version of the intellectual property?
5. Is there a verifiable industry benchmark or rule-of-thumb regarding the intellectual property in the industry (like price per customer, subscriber, or patient)?

The analyst may also inquire as to how the industry competitors function without the intellectual property. The owner/operator enjoys the use of the intellectual property, and the competitors do not enjoy the use of the intellectual property. The competitors may or may not have intellectual property that are comparable (or at least corresponding) to the subject intellectual property. The analyst may consider the following inquiries:

1. Do industry competitors have intellectual property that correspond to the subject (or is the subject intellectual property unique in the industry)?
2. Did the competitors build or buy their corresponding intellectual property?
3. Are there discernible generations of the corresponding intellectual property in the industry?
4. Have any competitors been acquired recently, and, if so, do the acquirers report the fair value of the corresponding intellectual property in any public financial statements?
5. Are there any competitors who operate without a corresponding intellectual property and, if so, how (for example, a contract manufacturer that does not manufacture its own product brands)?

The analyst may inquire as to how the competitors' corresponding intellectual property (if any) compare to the subject intellectual property. The analyst may consider the following questions:

1. Is there any objective measure of relative intellectual property effectiveness (like a consumer brand awareness study regarding product trademarks)?
2. Is there any objective measure of the relative size of intellectual property between the competitors (such as the number of patents owned by the competitors)?
3. Is there any way to compare relative age or RUL of intellectual property among the competitors?
4. Is there a reported market for the intellectual property in the industry (such as for FCC spectrum licenses)?

The analyst may inquire about the life cycle of the intellectual property and the relative position of the intellectual property within that life cycle. The analyst may consider the following questions:

1. Is it possible to estimate the intellectual property RUL?
2. Is it possible to estimate the intellectual property total life cycle?
3. Is it possible to estimate the typical life cycle of any corresponding intellectual property in the industry?
4. How does obsolescence (in any form) affect the performance of the intellectual property?
5. What efforts or expenditures have the owner/operator made to extend the RUL of the intellectual property?

## GENERALLY ACCEPTED INTELLECTUAL PROPERTY VALUATION APPROACHES

There are three generally accepted intellectual property valuation approaches: the cost approach, the market approach, and the income approach. Valuation analysts typically consider, and attempt to apply, all three approaches in each intellectual property valuation. This is because multiple approaches provide multiple value indications. These multiple value indications often reconcile into a reasonable range of values (e.g., with the analyst considering the mean, median, modes, interquartile measures, and other measures). In addition, ideally, these multiple value indications provide mutually supportive evidence of the analyst's final value conclusion.

Practically, most intellectual property valuations are based principally on one approach. For each intellectual property valuation, the analyst will select the approach (or approaches) based on the following:

1. Those with the greatest quantity and quality of available data
2. Those that best reflect the actual transactional negotiations of market participants in that industry
3. Those that best fit the characteristics (e.g., use, age, etc.) of the subject intellectual property

4. Those that are most consistent with the practical experience and professional judgment of the analyst

Within each approach, there are several valuation methods that the analyst can select and apply. Therefore, valuation methods are performed within an approach to conclude a value indication. And, within each method, there are numerous procedures that the analyst can perform. Therefore, valuation procedures are performed within a method to conclude a value indication.

The analyst may perform two or more valuation methods within a single approach. For example, the analyst may perform three different income approach methods and reconcile the three value indications to conclude a single income approach value indication.

## COST APPROACH VALUATION METHODS

There are several valuation methods within the cost approach. Each valuation method uses a particular definition (or measurement metric) of cost. Two common cost definitions are as follows:

1. Reproduction cost new
2. Replacement cost new

Reproduction cost new measures the total cost, at current prices, to develop an exact duplicate of the subject intellectual property. Replacement cost new measures the total cost, at current prices, to develop an intangible asset having the same functionality or utility as the subject intellectual property. Functionality is an engineering concept that means the ability of the intellectual property to perform the task for which it was designed. Utility is an economics concept that means the ability of the intellectual property to provide an equivalent amount of satisfaction to the owner/operator.

There are also other cost definitions that may be applicable to a cost approach valuation. Some valuation analysts consider a measure of cost avoidance as a cost approach method. This method quantifies either historical or prospective development costs that are avoided because the owner/operator already owns the subject intellectual property.

Some analysts consider trended historical costs as a current cost measure. In this method, the intellectual property historical development costs are identified and trended to the valuation date by the use of an inflation-based index factor. This trended historical cost method is particularly applicable when:

1. the subject intellectual property is relatively new or
2. the owner/operator has fairly complete records regarding the historical development costs and efforts.

In addition, the cost trend index should be appropriate to the type of costs that are being indexed to current prices.

Regardless of the specific cost definition that is used in the cost accounting analysis, all cost approach methods (including reproduction cost, replacement cost, or some other cost measurement) should include a comprehensive measurement of cost.

The cost measurement typically includes the following four cost components: (1) direct costs (e.g., materials and supplies), (2) indirect costs (e.g., engineering and design expenses, legal fees), (3) an intellectual property developer's profit (e.g., a profit margin percent applied to the direct cost and indirect cost investment), and (4) an opportunity cost/entrepreneurial incentive (e.g., a measure of lost income opportunity cost during the intellectual property development period adequate to motivate the development process).

The intellectual property cost new (however measured) should be adjusted for any decreases in value due to the following:

1. Physical deterioration
2. Functional obsolescence
3. Economic obsolescence

Physical deterioration is the reduction in asset value due to physical wear and tear. It is unlikely that an intellectual property will experience physical deterioration.

Functional obsolescence is the reduction in asset value due to the subject intellectual property's inability to perform the function (or yield the periodic utility) for which it was originally designed. The technological component of functional obsolescence is a decrease in asset value due to improvements in technology that make the subject intellectual property less than the ideal replacement for itself.

Economic obsolescence is a reduction in asset value due to the effects, events, or conditions that are external to—and not controlled by—the intellectual property's current use or condition. The impact of economic obsolescence is typically beyond the control of the intellectual property owner/operator. Economic obsolescence is often analyzed with respect to the owner/operator's ability to earn a fair rate of return on the actual intellectual property.

## COST APPROACH EXAMPLE— COPYRIGHTS AND TRADE SECRETS

As part of an asset-based approach business valuation, the analyst was retained to value the copyrights and trade secrets related to the internally developed computer software owned and operated by Alpha to Omega Railroad Company (“AORR”). The software-related copyrights and trade secrets are referred to collectively as “the subject software.”

The objective of the assignment is to estimate the fair market value of the subject software as of January 1, 2018.

The subject software encompasses the copyrights on—and the trade secrets related to—all management information systems, including software required for payroll, customer billing, regulatory filing, financial analyses, and the like. The number of physical lines of code for this software is approximately 28 million.

Based on the quantity and quality of available data, the analyst decided to use the cost approach—and the reproduction cost new less depreciation (“RCNLD”) method—in this valuation. The analyst used two software development effort estimation models to provide input into the replacement cost new estimate:

1. the constructive cost model (or COCOMO) and
2. the SPR KnowledgePLAN model (or KPLAN).

The analyst estimated a full absorption cost per software developer person-month based on data provided by AORR management. AORR management provided data related to salary, bonus, salary incentive, payroll taxes, fringe benefits, and overhead for the AORR employees involved in software development. AORR management provided data related to hourly costs for both onshore and offshore contractors used in the software development.

The analyst made several specific adjustments in order to recognize any value decrement associated with obsolescence. These adjustments provide an allowance for obsolescence (a reduction in the value that would be estimated if obsolescence was not recognized). These obsolescence adjustments are summarized as follows:

1. The analyst made an adjustment to the software line-of-code counts to eliminate duplicate, inactive, obsolete, and one-time programs from our analysis.
2. The analyst made adjustments for any software systems that were partially or fully retired or are in the process of being retired or replaced.

One of the primary inputs to both COCOMO and KPLAN is the size of the software to be developed. The software size measure used in COCOMO is lines of source code. Source code refers to the program as written by a programmer. This type of code is different from the object code, which is the machine language code executed by the computer. Source code is converted to object code by use of a compiler, assembler, or interpreter. Hereafter, all references to lines of code are to lines of source code.

The analyst was provided with line-of-code counts by software system.

Employee counts and total monthly salary figures for AORR applications development employees are presented in Exhibit 1. These figures are presented by job title within job level. As of January 1, 2018, there were 422 AORR application development employees with a total monthly salary of \$3,137,465. The average monthly salary for these employees was \$7,435.

The full absorption cost per person-month estimate analysis is presented in Exhibit 2. To estimate a full absorption cost per person-month, the analyst estimated the costs, in addition to the direct salaries, related to the AORR employees as a percent of the direct salaries.

The analyst was provided with the dollar amounts of the bonus and salary incentive pools for AORR applications development employees. Because these are annual pools, the analyst compared these pools to total annual salaries (total monthly salaries times 12) to estimate bonus and salary incentives as a percent of salaries. The AORR bonus and salary incentive pools represented 14 percent and 3 percent, respectively, of total annual AORR applications development salaries.

AORR management estimated (1) payroll taxes and employee benefits for AORR employees to be 44.1 percent of salaries and (2) rent, utilities, and other overhead to be 8.0 percent of salaries.

Based on the described additional costs as a percent of salaries, the analyst estimated a direct and indirect cost per person-month for the AORR applications development employees of \$12,573.

AORR also uses both domestic contractors and offshore contractors to develop software. The domestic and offshore contractors’ costs include a developer’s profit. For AORR personnel, in order to add a developer’s profit estimate, the analyst added a developer’s profit of 3 percent to the AORR personnel cost of \$71.44 to estimate a cost of \$73.58.

The analyst estimated a blended direct cost, indirect cost, and developer’s profit cost per person-month based on the actual mix of AORR employees,



**Exhibit 1**  
**Alpha to Omega Railroad Company**  
**Software Copyrights and Trade Secrets**  
**Cost per Person-Month Analysis**  
**As of January 1, 2018**

Personnel Level	Number of Employees	Personnel Titles	Average Monthly Salary \$	Total Monthly Salary \$
Mid A	13	Associate Applications Developer (13)	4,745	61,685
High A	29	Applications Developer (24) Junior Protect Consultant (5)	4,903	142,187
Low B	32	Associate Project Analyst (7) Associate Project Engineer (5) Senior Applications Developer (20)	5,095	163,040
Mid B	85	Project Analyst (5) Project Engineer (21) Analyst Systems & Method (2) Senior Project Consultant (17) Senior Project Engineer (40)	6,209	527,765
High B	90	Associate Systems Consultant (13) Associate Systems Engineer (68) Associate Systems Engineer (2) Manager (7)	7,409	666,810
Low C	69	Systems Consultant (13) Systems Engineer (56)	8,396	579,324
Mid C	68	Senior Manager (39) Senior System Consultant (9) Senior System Engineer (20)	9,127	620,636
High C	20	Director (15) Principal Consultant (2) Principal Engineer (3)	9,964	199,280
Low D	2	Director Train Control System (2)	10,951	21,902
Mid D	1	Senior Principal Engineer (1)	10,900	10,900
High D	<u>13</u>	General Director (12) General Director (1)	11,072	<u>143,936</u>
Exhibit Totals	<u>422</u>			<u>3,137,465</u>
Total Weighted Average Monthly Salary				<u>\$ 7,435</u>

**Exhibit 2**  
**Alpha to Omega Railroad Company**  
**Software Copyrights and Trade Secrets**  
**Full Absorption Cost per Person-Month Analysis**  
**As of January 1, 2018**

Cost of Intellectual Property Development	AORR Personnel \$ Costs	AORR Personnel % Costs	Domestic Contractors	Offshore Contractors	Total AORR and Contractors
Bonus and Salary Incentive Pools as a Percent of Annual Salary					
Total Monthly Salary (from Exhibit 1)	\$3,137,465				
Times: 12 Months	<u>12</u>				
Annual Salary	37,649,580				
Total Bonus Pool	5,260,300	14%			
Bonus Pool as a Percent of Annual Salary (rounded)					
Total Salary Incentive Pool	1,113,180	3%			
Salary Incentive Pool as a Percent of Annual Salary (rounded)					
Full Absorption Cost per Person-Month					
Direct Costs Weighted Average Monthly Salary (from Exhibit 1)	7,435				
Additional Indirect Costs as a Percent of Salary					
Bonus Pool (from above)		14%			
Salary Incentive (from above)		3%			
Payroll Taxes and Fringe Benefits		44%			
Rent, Utilities, and Overhead		8%			
Total Indirect Costs as a Percent of Salary		69%			
Indirect Costs (total indirect cost as a percent of salary times average monthly salary)	<u>5,138</u>				
Direct and Indirect Cost per Month (average monthly salary plus additional costs)	12,573				
Divided by: Number of Hours per Month	176				
Direct and Indirect Cost per Hour	<u>71.44</u>				
Computer Software Developer's Profit		3%			
Direct Cost, Indirect Cost, and Developer's Profit per Hour (AORR at \$71.44 * (1+.03))	73.58		74.50	21.69	
Times: Number of Personnel (AORR employees)	<u>422</u>		<u>116</u>	<u>470</u>	<u>1008</u>
Total Direct Cost, Indirect Cost, and Developer's Profit per Hour	<u>31,052</u>		<u>8,642</u>	<u>10,194</u>	<u>49,887</u>
Total Direct Cost, Indirect Cost, and Developer's Profit per Hour (including contractors)	49,887				
Divided by: Total Number of Personnel (including contractors)	<u>1,008</u>				
Weighted Average Direct Cost, Indirect Cost, and Developer's Profit Cost per Person-Hour	49,49				
Times: Hours per Person-Month	176				
Weighted Average Direct Cost, Indirect Cost, and Developer's Profit per Person-Month	8,710				
Entrepreneurial Incentive as a Percent of Direct Cost, Indirect Cost, and Developer's Profit		24%			
Weighted Average Full Absorption Cost per Person-Month (rounded)					<u>\$10,800</u>

domestic contractors, and offshore contractors. AORR management provided the average hourly fees paid to onshore contractors and offshore contractors. The analyst converted the estimated direct and indirect cost per person-month to equivalent costs per hour using 176 hours per person-month (8 hours per day times 22 days per month).

The analyst computed a weighted average direct cost, indirect cost, and developer's profit cost per hour based on the number of employees and contractors in each of the three groups and the average cost per hour for each of the three groups. This calculation resulted in an estimated direct cost, indirect cost, and developer's profit cost per hour of \$49.49.

The analyst multiplied this hourly figure by 176 hours (see the preceding paragraph) to estimate a weighted average direct cost, indirect cost, and developer's profit cost per person-month of \$8,710. The analyst multiplied this monthly rate by an entrepreneurial incentive rate of 24 percent to estimate the weighted average full absorption cost per person-month of \$10,800.

Based on the analysis of the average salary structure for the AORR software development personnel and other personnel related expenses incurred by AORR (including contractor fees), the analyst estimated a full absorption cost per person-month of \$10,800.

The analyst estimated the computer software development effort estimate by calculating an average of the COCOMO and KPLAN software development effort estimates. This analysis is summarized in Exhibit 3.

The analyst multiplied the computer software development effort estimate by the full absorption cost per person-month to estimate the software RCNLD. This full absorption cost per person-month includes salary, bonus, payroll taxes, employee benefits, and overhead for AORR employees blended with costs related to domestic and offshore contractors, developer's profit, and an entrepreneurial incentive cost. This analysis is also summarized in Exhibit 3.

The analyst applied the cost approach and the RCNLD method to estimate the fair market value of the copyrights and trade secrets associated with the AORR software (the "subject software").

Based on the analysis summarized in Exhibit 3, the fair market value of the subject software intellectual property, as of January 1, 2018, is \$222,600,000.

## MARKET APPROACH VALUATION METHODS

Analysts typically attempt to apply market approach methods first in an intellectual property valuation. This is because "the market"—that is, the economic environment where arm's-length sale or license transactions between unrelated parties occur—is often the best indicator of value.

However, the market approach will only provide meaningful valuation evidence when the subject intellectual property is sufficiently similar to the intellectual properties that are actually transacting (by sale or license) in the marketplace. If that is the case, the guideline intellectual property transaction (sale or license) prices may provide evidence of the expected price for the subject intellectual property.

There are two principal intellectual property market approach valuation methods:

1. The comparable uncontrolled transaction ("CUT") method
2. The comparable profit margin ("CPM") method.

In the CUT method, the analyst searches for arm's-length sales or licenses of benchmark intellectual property. In applying the CUT method, the analyst often performs a relief from royalty ("RFR") method analysis. In the CPM method, the analyst searches for companies that provide useful benchmarks to the subject owner/operator company.

In the CUT method, the analyst will more likely rely on CUT license transactions than on CUT sale transactions. This is because third-party licenses of intellectual property are more common than third-party sales of intellectual property. Nonetheless, for both sale and license transactions, the valuation analyst will follow a systematic methodological process in the CUT method valuation.

First, the analyst should research the appropriate exchange markets to obtain information about sale or license transactions involving guideline (i.e., generally similar) or comparable (i.e., almost identical) intellectual property that may be compared to the subject intellectual property. Some of the relevant comparison attributes include characteristics such as intellectual property type, intellectual property use, historical and expected future usage, industry in which the intellectual property operates, date of sale or license, and so forth.

Second, the analyst should verify the transactional information by confirming that (1) the transactional data are factually accurate and (2) the sale or license exchange transactions reflect arm's-

**Exhibit 3**  
**Alpha to Omega Railroad Company**  
**Software Copyrights and Trade Secrets**  
**Cost Approach**  
**Reproduction Cost New less Depreciation Method**  
**Valuation Summary**  
**As of January 1, 2018**

Valuation Variable	RCNLD Component
COCOMO Model Development Effort Estimate before Obsolescence - Number of Person-Months	26,649
KnowledgePLAN Model Development Effort Estimate before Obsolescence - Number of Person-Months	<u>21,953</u>
Average COCOMO and KnowledgePLAN Person-Month Effort Estimate before Obsolescence Adjustment	24,301
Direct Cost, Indirect Cost, and Developer's Profit Cost Components per Person-Month	<u>\$8,710</u>
Total Direct Cost, Indirect Cost, and Developer's Profit Replacement Cost Components	\$211,672,125
COCOMO Model Development Effort Estimate Net of Obsolescence	21,507
KnowledgePLAN Model Development Effort Estimate Net of Obsolescence	<u>19,710</u>
Average COCOMO and KnowledgePLAN Person-Month Effort Estimate after Obsolescence Adjustment	20,609
Full Absorption RCNLD per Person-Month	<u>\$10,800</u>
Computer Software RCNLD	<u>\$222,571,800</u>
Fair Market Value of Software Copyrights and Trade Secrets (rounded)	<u><u>\$222,600,000</u></u>

length market considerations. If the guideline sale or license transaction was not concluded at arm's-length market conditions, then adjustments to the transactional pricing data may be necessary. This verification procedure may also elicit additional information about the current market conditions for the sale or license of the subject intellectual property.

Third, the analyst should select relevant units of comparison (e.g., income pricing multiples or dollars per unit—such as price “per drawing” or “per line of code”). Then, the analyst should develop a comparative analysis for each selected unit of comparison.

Fourth, the analyst also compares the selected guideline or comparable sale or license transactions with the subject intellectual property, using the selected elements of comparison. Next, the analyst adjusts the sale or license price of each guideline transaction for any differences between the guideline/comparable intellectual property and the subject intellectual property. If such comparative adjustments cannot be measured, then the analyst may eliminate the sale or license transaction as a guideline/comparable for future consideration.

Fifth, the analyst selects the subject intellectual-property-specific pricing metrics from the range of pricing metrics indicated from the guideline or comparable transactions. The analyst may select pricing multiples at the low end, midpoint, high end, or even outside of the range of pricing metrics indicated by the guideline sale or license transactional data. The valuation analyst selects the subject-specific pricing metrics based on the analyst's comparison of the subject intellectual property to the guideline/comparable intellectual property.

Sixth, the analyst applies the subject-specific selected pricing metrics to the subject intellectual property financial or operational fundamentals (e.g., revenue, income, number of drawings, number of lines of code, etc.). This procedure typically results in several market-derived value indications for the subject intellectual property.

Seventh, the analyst should reconcile the various value indications produced from the analysis of the guideline sale and/or license transactions into a single market approach value indication. In this final reconciliation procedure, the valuation analyst summarizes and reviews (1) the transactional data and (2) the quantitative analyses (i.e., various pricing multiples) that resulted in each value indication. Finally, the valuation analyst should resolve these value indications into a single market approach value indication.

The CPM method is also based on a comparative analysis. However, in this valuation method, the analyst is not relying on sales or licenses of comparable or guideline intellectual property. Rather, the valuation analyst is searching for comparable or guideline companies. The objective of the CPM method is to identify guideline companies that are comparative to the owner/operator in all ways except one. The owner/operator, of course, owns the subject intellectual property.

Ideally, the selected guideline companies should operate in the same industry as the owner/operator and should provide a comparable benchmark to the owner/operator. However, the selected guideline companies do not own a comparable intellectual property.

Ideally, the CPM method guideline companies operate in the same industry as the owner/operator. Ideally, the guideline companies have the same types of raw materials and the same types of sources of supply. Ideally, the guideline companies have the same type of customers. Ideally, the guideline companies produce the same type of products or services. And, ideally, the only material difference should be that the owner/operator has an established trademark and the guideline companies have generic trademarks. Or, the owner/operator owns the subject patent and the guideline companies produce unpatented (and presumably inferior) products.

Because of the economic benefit that the intellectual property provides, the owner/operator should earn a higher profit margin than the selected guideline companies. This profit margin comparison is usually made at the earnings before interest and taxes (or EBIT) level of income. The incremental (or superior) profit margin (typically measured as the EBIT margin) earned by the owner/operator can then be converted into an intellectual-property-related royalty rate.

Typically, all of the excess profit margin is assigned to the intellectual property (if the subject intellectual property is the only reason for the owner/operator superior profit margin).

This royalty rate (derived from the excess profit margin) is then multiplied by the owner/operator revenue in order to estimate the amount of implied royalty income generated from the subject intellectual property. This hypothetical royalty income is typically capitalized over the intellectual property expected RUL. The result of this capitalization procedure is an estimate of the intellectual property value, according to the CPM method.

In summary, there are several intellectual property market approach valuation methods. These

methods are all based on comparative analyses of either comparable (or guideline) intellectual property sales, comparable intellectual property license royalty rates, or comparable companies (that own and operate generic intellectual property).

## MARKET APPROACH EXAMPLE— TRADEMARKS

Phi Company (“Phi”) is a designer and manufacturer of high-end women’s apparel products. Phi retained the analyst to perform an asset-based approach business valuation as of January 31, 2018. One of the Phi intangible assets is the Chi trademark and trade name. Chi is a trademark of high-end women’s apparel products, particularly sportswear apparel.

The analyst decided to use the market approach and the RFR method to value the Chi trademarks.

The analyst performed the following procedures to estimate an arm’s-length royalty rate appropriate to the Chi trademark:

- Discussed the intended use of the Chi trademark with Phi management
- Searched for guideline arm’s-length license transactions to use in the valuation
- Estimated the appropriate market-based royalty rate for the Chi trademark
- Estimated the Chi trademark required rate of return
- Estimated the Chi trademark RUL to apply in the RFR method to conclude an initial value indication
- Adjusted the initial value indication for a tax amortization benefit adjustment (that is, market participants would expect to benefit from the amortization income tax deductions related to the subject Section 197 intangible asset)
- Concluded a final value indication for the Chi trademark.

The analyst reviewed several databases that report arm’s-length intellectual property license agreements. These license agreements indicated an average and a median market-based royalty rate of 6.2 percent and 6.5 percent, respectively.

Based on the analyst’s assessment of the various trademark or trade name arm’s-length license agreements in the marketplace, and the analyst’s consideration of the Phi management plans to showcase the Chi brand within the Phi clothing segment, the analyst concluded a royalty rate of 6.5 percent for the Chi trademark.

The analyst calculated the fair market value of the trademark as the present value of the expected after-tax “relief from royalty” payment savings attributed to the acquired trademark. The analyst calculated the relieved royalty payment by applying the selected royalty rate to the projected Chi product line revenue.

The analyst applied the selected royalty rate of 6.5 percent to the projected revenue attributed to Chi branded products for the fiscal years ended January 31, 2019, through January 31, 2024. The projected revenue, which was based on Phi management revenue projections, contemplates a 2 percent annual growth rate in the dollar volume of Chi branded products.

After the year ended January 31, 2024, Phi management expects to replace the Chi trademark and trade name with a new trademark and trade name. Therefore, the analyst selected five years as the Chi trademark RUL. The analyst reviewed the selected CUT license agreements. In these agreements, the licensor was responsible for the intangible asset maintenance and legal expenses. Therefore, the analyst does not need to adjust the relief from royalty payment for any expenses that would be paid by Phi (as the hypothetical licensee).

The analyst adjusted the annual royalty payment for income taxes and discounted the after-tax savings to a present value. The present value discount rate reflects the risks inherent in the trademark intangible asset. The analyst used a present value discount rate of 14 percent, which was the Phi cost of capital.

This analysis is summarized in Exhibit 4.

Based on the RFR method, the indicated fair market value of the Chi trademark is approximately \$15,284,000. Based on the market approach and the RFR method analysis, the fair market value of the Chi trademark as of January 31, 2018, was \$15,300,000 (rounded).

## INCOME APPROACH VALUATION METHODS

In this valuation approach, the intellectual property value is estimated as the present value of the future income from the ownership/operation of the subject intellectual property. The present value calculation has three principal components:

1. An estimate of the duration (or term) of the intellectual property income projection period, typically measured as the intellectual property RUL

**Exhibit 4**  
**Phi Corporation**  
**Chi Trademarks and Trade Names**  
**Market Approach**  
**Relief from Royalty Method**  
**As of January 31, 2018**

Valuation Variable	Projected Fiscal Year Ended January 31,					
	2019 \$000	2020 \$000	2021 \$000	2022 \$000	2023 \$000	2024 \$000
Projected Product Line Revenue [a]	84,846	86,543	88,274	90,039	91,480	93,677
Arm's-Length License Royalty Rate [b]	<u>6.50%</u>	<u>6.50%</u>	<u>6.50%</u>	<u>6.50%</u>	<u>6.50%</u>	<u>6.50%</u>
Pretax Royalty Payment Relief	5,515	5,625	5,738	5,853	5,946	6,089
Income Taxes at 36% [c]	<u>1,985</u>	<u>2,025</u>	<u>2,066</u>	<u>2,107</u>	<u>2,141</u>	<u>2,192</u>
After-Tax Royalty Payment Relief	3,530	3,600	3,672	3,746	3,806	3,897
Present Value Factor at 14% [d]	<u>0.9366</u>	<u>0.8216</u>	<u>0.7207</u>	<u>0.6322</u>	<u>0.5545</u>	<u>0.4864</u>
Discounted Royalty Payment Relief	<u>3,306</u>	<u>2,958</u>	<u>2,646</u>	<u>2,368</u>	<u>2,110</u>	<u>1,896</u>
Total Present Value of Royalty Payment Relief	<u>15,284</u>					
Fair Market Value of Chi Trademarks (rounded)	<u>15,300</u>					

[a] Revenue estimates based on Phi management projections.

[b] Royalty rate based on analysis of CUT trademark license agreements.

[c] Based on Phi management estimates.

[d] Present value factors are based on Phi cost of capital and assumes a midyear discounting convention.

2. An estimate of the intellectual-property-related income for each period in the projection, typically measured as either owner income (e.g., license royalty income), operator income (e.g., some portion of business enterprise income), or both
3. An estimate of the appropriate present value discount rate or direct capitalization rate, typically measured as the required rate of return on an investment in the intellectual property

For purposes of the income approach, the RUL relates to the period of time over which the owner/operator expects to receive any income related to the intellectual property (1) license, (2) use, or (3) forbearance of use. In addition to the term of the RUL, the analyst is also interested in the shape of the RUL curve. That is, the analyst is interested in the annual rate of decay of the intellectual property future income.

For purposes of the income approach, many different intellectual property income measures may be relevant. If properly applied, these different income measures can be used in the income approach

to derive an intellectual property value indication. Some of the different intellectual-property-related income measures include the following:

1. Gross or net revenue
2. Gross income (or gross profit)
3. Net operating income
4. Net income before tax
5. Net income after tax
6. Operating cash flow
7. Net cash flow
8. Incremental income
9. Differential income
10. Royalty income
11. Excess earnings income
12. Several others (such as incremental income)

Because there are different income measures that may be used in the income approach, it is important for the capitalization rate (either the present value discount rate or the direct capitalization rate) to be derived on a basis consistent with the income measure used.

## INCOME APPROACH EXAMPLE— TRADE SECRET

This subject trade secret relates to the manufacture of soda pop that uses nitrogen instead of carbon dioxide to create the fizz. The company that manufactures the soda pop is called Nitroco, and the soda pop is called NitroPop. This trade secret includes the proprietary manufacturing process by which the soda pop is manufactured and placed in cans with the nitrogen cartridges.

The trade secret is the canning and fizzing manufacturing process (“the process”) of the NitroPop product recipe and formulation. The nitrogen fizzing process creates a creamier and more fizzy soda pop. The process works especially well for root beer and cream soda, but it is also used for cola and other soda flavors. This process is documented in a proprietary, confidential set of engineering drawings and process flow chart notebook.

Nitroco management has elected not to patent this proprietary process for competitive reasons. Both the Nitroco engineers and legal counsel believe that the process would be patentable. However, if the proprietary process became public knowledge through the patent process, management is concerned that the company’s competitors could reverse engineer an equally effective manufacturing process that does not violate the patent.

Nitroco management considers this proprietary technology to be a trade secret. All of the engineering and other documentation related to this manufacturing process is protected in a locked cabinet in the process engineering department. Only a select number of engineering and production managers have access to that information, and all of those employees have signed nondisclosure agreements.

Management also believes that this process gives the NitroPop product a distinct competitive advantage. Nitroco marketing personnel stress this product differentiation feature in all of the company’s marketing materials and presentations.

As part of an asset-based approach business valuation, the analyst was retained to estimate the fair market value of the Nitro process trade secret as of December 31, 2017.

The Nitro process is used in the manufacture of a soda pop product line that is projected to generate \$147 million in revenue next year.

Based on the quality and quantity of available data, the analyst decided to use the income approach and the comparative income method to value the trade secret.

## Income Approach Analysis

Using the comparative income method, the analyst first projected the Nitroco prospective cash flow associated with the use of the proprietary process in its current operation. Second, the analyst projected the prospective cash flow that would be generated by Nitroco without the use of the proprietary process. The income approach value indication is based on the difference between the present value indications from the two different operating scenarios (that is, with and without the proprietary process trade secret in current operation).

Nitroco management provided the analyst with projections of the NitroPop product unit selling price, unit volume, and market share for the five years after the valuation date. Management also projected the cost of goods sold and the capital expenditure data related to the production of the NitroPop product. Management prepared a five-year projection of the selling, general, and administrative expenses related to the NitroPop product line.

After a due diligence review of the financial projections, including interviews with company management, the analyst concluded that these financial projections were reasonable. Based on the quality and quantity of these prospective financial data, the analyst concluded that the income approach, using a comparative income method, provides a supportable value estimate.

This valuation method measures the difference in the income potential of Nitroco both with and without the operation of the trade secret. The income potential represents the amount of income that is available to the business owners after consideration of a required level of reinvestment for continued operations and for expected growth. Based on the prospective financial data available, the analyst selected net cash flow as the appropriate measure of income.

For purposes of this valuation, the analyst defined net cash flow as follows.

	Net sales
–	Cost of sales
–	<u>Operating expenses</u>
=	Net income before taxes
–	Income taxes
+	Depreciation and amortization expense
–	Capital expenditures
–	Additions to net working capital
–	<u>Capital charge on contributory assets</u>
=	Net cash flow

In this analysis, the product line net cash flow was projected over the trade secret’s RUL. The



analyst discounted the net cash flow projection at an appropriate discount rate to conclude a present value. The difference between the present value of the product line net cash flow with the proprietary process in operation and without the proprietary process in operation indicates the preliminary value estimate for the trade secret.

Both Nitroco and its competitors continuously develop improved soda pop products that are produced by improved manufacturing processes. The Nitroco process engineering staff is already working on the development of a new and improved fizzing process. Management expects that the new and improved process will be developed, tested, and implemented within five years. At that time, the current proprietary process will be obsolete and completely replaced by the new and improved fizzing process.

The analyst selected the following valuation variables for this analysis:

Scenario I: With the proprietary process trade secret in operation

- Net sales growth rate: 10 percent per year
- Gross margin percentage: 26 percent of net sales
- Operating expenses: 11 percent of net sales
- Effective income tax rate: 36 percent of pretax income
- Depreciation expense: 1 percent of net sales
- Net capital expenditures: equal to depreciation expense
- Capital charge on all contributory assets: \$2.2 million per year
- Incremental net working capital: 5 percent of net sales
- Present value discount rate: 15 percent
- RUL estimate: five years

Scenario II: Without the proprietary process trade secret in operation

- Expected sales decrement: (-10 percent) per year
- Operating expenses: 11.5 percent of net sales
- Incremental net working capital: 7 percent of net sales
- All other valuation variables remain unchanged from scenario I

The contributory asset charge (“CAC”) is included to account for the fair return of the investment of all the contributory assets that are used or used

up in the production of the income associated with the subject trade secret. The contributory assets include net working capital, tangible operating assets, and the trade name.

The projected decrease in product line sales without the proprietary process in operation is based on valuation analyst discussions with management. This projected sales decrease indicates management’s estimate of the consumer response to the decrease in taste, fizziness, and retail shelf life of the company’s product without the proprietary process.

The decrease in sales reflects management’s projection of the combined effects of decreased unit selling price and decreased unit volume sales. Without the product differentiation provided by the Nitroco process, management estimates that it would have to increase its marketing expense. This marketing expense increase accounts for the one-half of 1 percent projected increase in other operating expenses.

In addition, management projects that it would have to relax its customer credit policy in order to stimulate sales of the less desirable NitroPop product. Management estimates that it would have to give 60-day credit terms instead of 30-day credit terms. This change in credit policy would affect the company’s accounts receivable balances and would result in a change in the company’s net working capital investment.

The 15 percent present value discount rate is based on the analyst’s estimate of the Nitroco weighted average cost of capital. The analyst concluded that this discount rate is appropriate based on the selected measure of income and the stated standard of value and premise of value.

As presented in Exhibit 5, the sum of the product line discounted cash flow with the proprietary process in operation is \$49,500,000. As presented in Exhibit 6, the sum of the product line discounted cash flow without the proprietary process in operation is \$40,900,000. The difference between these two limited life income projections indicates a discounted cash flow differential related to the proprietary process trade secret of \$8,600,000.

The unadjusted discounted net cash flow differential associated with the proprietary process is \$8,600,000. However, this unadjusted cash flow differential does not consider the fact that this intellectual property would qualify as an Section 197 intangible asset to the buyer. Therefore, the economic benefit related to TAB should be considered in the valuation.

An intellectual property that is amortizable for federal income tax purposes provides an income tax

**Exhibit 5**  
**Nitroco, Inc.**  
**NitroPop Product Trade Secret**  
**Income Approach**  
**Comparative Income Method**  
**Scenario I: With the Proprietary Process Trade Secret in Operation**

NitroPop Product Line Projection Variables (\$ in 000s)	Year 1	Year 2	Year 3	Year 4	Year 5
Net Sales	\$146,912	\$161,603	\$177,764	\$195,540	\$215,094
Gross Margin	38,197	42,017	46,219	50,840	55,924
Operating Expenses	<u>-16,160</u>	<u>-17,776</u>	<u>-19,554</u>	<u>-21,509</u>	<u>-23,660</u>
Earnings before Interest and Taxes	22,037	24,240	26,665	29,331	32,264
Income Tax Expense	<u>-7,933</u>	<u>-8,727</u>	<u>-9,599</u>	<u>-10,559</u>	<u>-11,615</u>
Debt-free Net Income	14,104	15,514	17,065	18,772	20,649
Depreciation Expense	1,469	1,616	1,778	1,955	2,151
Capital Expenditures	-1,469	-1,616	-1,778	-1,955	-2,151
Capital Charge on Contributory Assets	-2,200	-2,200	-2,200	-2,200	-2,200
Incremental Net Working Capital Investment	<u>-696</u>	<u>-735</u>	<u>-808</u>	<u>-889</u>	<u>-978</u>
Net Cash Flow	11,208	12,579	14,057	15,683	17,471
Present Value Discount Factor [a]	<u>0.9325</u>	<u>0.8109</u>	<u>0.7051</u>	<u>0.6131</u>	<u>0.5332</u>
Discounted Net Cash Flow	<u>10,451</u>	<u>10,200</u>	<u>9,912</u>	<u>9,616</u>	<u>9,315</u>
Sum of Product Line Discounted Net Cash Flow (rounded)	<u>49,500</u>				

[a] Present value factors are based on Nitroco weighted average cost of capital and assumes a midyear discounting convention.

expense reduction (that is, a cash flow benefit) to the intellectual property buyer. That cash flow benefit is typically calculated as the present value of the expected reduction in future income tax expense due to the intellectual property amortization tax deductions.

The calculation of this TAB factor value increment follows:

$$\frac{1}{1 - \left( \frac{\text{income tax rate}}{\text{amortization period}} \right) \times \text{present value annuity factor}}$$

Based on the TAB formula, the TAB factor for this analysis is 1.2 (rounded). The discounted net cash flow differential of \$8,600,000 multiplied by the TAB factor of 1.2 indicates the income approach final value of the trade secret.

As presented in Exhibit 7, the fair market value of the trade secret as indicated by the income approach and the comparative income method, as of December 31, 2017, is \$10,300,000.

## SUMMARY AND CONCLUSION

This discussion summarized what analysts need to know about the valuation of intellectual property as part of the application of the asset-based approach to business valuation. This generally accepted business valuation approach may be used to conclude a going-concern value for an industrial or commercial operating company.

The asset-based approach valuation methods often include the valuation of the subject company tangible assets and intangible assets. Intellectual property is a common category of intangible assets for many industrial and commercial companies. Therefore, intellectual property valuation is one common component in the application of the asset-based approach to business valuation.

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**Exhibit 6**  
**Nitroco, Inc.**  
**NitroPop Product Trade Secret**  
**Income Approach**  
**Comparative Income Method**  
**Scenario II: Without the Proprietary Process Trade Secret in Operation**

NitroPop Product Line Projection Variables (\$ in 000s):	Year 1	Year 2	Year 3	Year 4	Year 5
Net Sales	\$ 146,912	\$ 161,603	\$ 177,764	\$ 195,540	\$ 215,094
Expected Sales Decrement without NitroPop Process	<u>(14,691)</u>	<u>(16,160)</u>	<u>(17,776)</u>	<u>(19,554)</u>	<u>(21,509)</u>
Net Sales without Proprietary Process in Operation	\$ 132,221	\$ 145,443	\$ 159,988	\$ 175,986	\$ 193,585
Gross Margin	34,377	37,815	41,597	45,756	50,332
Operating Expenses	<u>(15,205)</u>	<u>(16,726)</u>	<u>(18,399)</u>	<u>(20,238)</u>	<u>(22,262)</u>
Earnings before Interest and Taxes	19,172	21,089	23,198	25,518	28,070
Income Tax Expense	<u>(6,902)</u>	<u>(7,592)</u>	<u>(8,351)</u>	<u>(9,186)</u>	<u>(10,105)</u>
Debt-free Net Income	12,270	13,497	14,847	16,331	17,965
Depreciation Expense	1,322	1,454	1,600	1,760	1,936
Capital Expenditures	(1,322)	(1,454)	(1,600)	(1,760)	(1,936)
Capital Charge on Contributory Assets	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
Incremental Net Working Capital Investment	<u>(841)</u>	<u>(926)</u>	<u>(1,018)</u>	<u>(1,120)</u>	<u>(1,232)</u>
Net Cash Flow	9,229	10,371	11,629	13,011	14,533
Present Value Discount Factor [a]	<u>0.9325</u>	<u>0.8109</u>	<u>0.7051</u>	<u>0.6131</u>	<u>0.5332</u>
Discounted Net Cash Flow	<u>8,606</u>	<u>8,410</u>	<u>8,200</u>	<u>7,978</u>	<u>7,749</u>
Sum of Product Line Discounted Net Cash Flow (rounded)	<u>40,900</u>				

[a] Present value factors are based on Nitroco weighted average cost of capital and assumes a midyear discounting convention.

**Exhibit 7**  
**Nitroco, Inc.**  
**NitroPop Product Trade Secret**  
**Income Approach**  
**Comparative Income Method**  
**As of December 31, 2017**

Sum of the Product Line Discounted Net Cash Flow	\$ in (000s)
Scenario I: With the Proprietary Process Trade Secret	\$ 49,500
Scenario II: Without the Proprietary Process Trade Secret	<u>40,900</u>
Trade Secret Discounted Net Cash Flow Differential	8,600
Times: Tax Amortization Benefit Factor (rounded) [a]	<u>1.2</u>
Indicated Fair Market Value of the Proprietary Process Trade Secret (rounded)	<u>\$ 10,300</u>

[a] Tax amortization benefit factor =

$$\frac{1}{1 - \left( \left( \frac{\text{income tax rate}}{\text{amortization period}} \right) \times \text{present value annuity factor} \right)}$$