Valuation of Technology-Related Intangible Assets

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Going-concern business entities may be the subject of an eminent domain or expropriation action. In such an instance, often, both the business entity's tangible assets and the business entity's intangible assets may be subject to the "taking." Therefore, the entity owner should receive reasonable compensation for both the tangible assets and the intangible assets. Many business entities own and operate technology-related intangible assets. This discussion explains—and illustrates—the valuation of technology-related intangible assets within an eminent domain reasonable compensation context.

Introduction

For many legitimate public benefit reasons, a going-concern business entity can become the subject of a condemnation, eminent domain, or expropriation action.

Sometimes, these business entities are just "in the way" of a highway construction, light rail system installation, airport expansion, or other public benefit development. Sometimes, the business entity is a utility-type business that operates by the authority of a government license or municipal franchise. Some common examples of such utility-type businesses include water and wastewater companies. In such instances, the government or municipal authority that issued the franchise has the legal right to "take" (or take over) the subject business entity.

In all of these cases, the government or municipal authority that is exercising its eminent domain rights must pay the business entity owner/operator reasonable compensation for the subject business entity.

In many cases, the agency with eminent domain authority will offer the business entity owner an amount of compensation equal to the value of the entity's real estate and tangible personal property. However, often, the government or municipal authority is "taking" more than the entity's real estate and equipment. Often, the government or municipal agency is taking (or, at least, disrupting) the entity's going-concern business operations.

When a going-concern business enterprise is the subject of an eminent domain or expropriation action, a valuation analyst ("analyst") is often called on to value the entity's technology-related intangible assets.

In such eminent-domain-related reasonable compensation analyses, the analyst can use any of the generally accepted property valuation approaches—that is, the cost approach, market approach, and income approach—to value such technology-related intangible assets.

Analysts may be retained by either the business owner/operator or its legal counsel to perform the technology intangible asset valuation. This is because the business entity subject to the eminent domain action also includes intangible personal property—also called intangible assets.

The subject entity's intangible assets often include technology-related intangible assets.

And, the value of the entity's intangible personal property may be part of the reasonable compensation due to the entity owner as a result of the "taking."

This discussion considers the following topics: (1) the definition of technology-related intangible assets; (2) the distinguishing attributes of technology intangible assets; (3) the typical factors that

affect the technology intangible asset value; and (4) the factors that analysts consider in assessing technology intangible asset value and remaining useful life (RUL).

In addition, this discussion presents an illustrative example of a technology intangible asset valuation related to an eminent domain taking.

Definition of Technology-Related Intangible Assets

For purposes of this discussion, technology-related intangible assets are broadly defined as intangible assets that create proprietary knowledge and processes. This proprietary knowledge or process may be either developed by, or purchased by, the business owner/operator.

In order for a technology intangible asset to have measurable value, it should provide, or have the potential to provide, a competitive advantage or a product differentiation. Any proprietary technology that confers a competitive advantage or product differentiation to the business owner/operator may be a technology intangible asset.

The following intangible assets are typically included in this category:

- Patents
- Patent applications
- Patentable inventions
- Trade secrets
- Know-how
- Proprietary processes
- Proprietary product recipes or formulae
- Confidential information
- Copyrights on technical materials such as computer software, technical manuals, and automated databases

Copyright-related intangible assets, software-related intangible assets, and patents and related intellectual property are included in the technology intangible asset category. However, this discussion focuses principally on know-how, trade secrets, proprietary processes, product recipes and formulas, and confidential information.

Technology-Related Intangible Assets Due Diligence

Whether or not the valuation analysis relates to an eminent domain or expropriation action, the analyst should understand the attributes of the technology-related intangible asset.

The analyst may consider the technology intangible asset attributes through the following due diligence questions:

1. What are the property rights related to the technology intangible asset? What are the functional attributes of the intangible asset?
2. What are the operational or economic benefits of the technology intangible asset to its current owner/operator? Will those operational or economic benefits be any different if the intangible asset is in the hands of a third-party owner/operator?
3. What is the current utility of the technology intangible asset? How will this utility change in response to changes in the relevant market conditions? How will this utility change over time? What industry, competitive, economic, or technological factors will cause the intangible asset utility to change over time?
4. Is the technology intangible asset typically owned or operated as a stand-alone asset? Or is the intangible asset typically owned or operated as (a) part of a bundle with other tangible assets or intangible assets or (b) part of a going concern business entity?
5. Does the technology intangible asset utility (however measured) depend on the operation of tangible assets or other intangible assets or the operation of a business entity?
6. What is the technology intangible asset highest and best use (HABU)?
7. How does the technology intangible asset affect the income of the owner/operator? This inquiry may include consideration of all aspects of the owner/operator's revenue, expense, and investments.
8. How does the technology intangible asset affect the risk (both operational risk and financial risk) of the owner/operator?
9. How does the technology intangible asset affect the competitive strengths, weaknesses, opportunities, and threats of the owner/operator?
10. Where does the technology intangible asset fall within its own technology life cycle, the overall technology life cycle of the owner/operator, the life cycle of the owner/operator industry, and the technology life cycle of both competing technologies and substitute technologies?

These inquiries do not present an exhaustive list of due diligence considerations. However, this due diligence gives the analyst a starting point for understanding the use and function of the technology intangible asset and the attributes that create value in the technology intangible asset.

Technology-Related Intangible Asset Value Attributes

Numerous factors may affect the technology intangible asset value. Industry, product, and service considerations provide a wide range of positive and negative influences on intangible asset value. To the extent possible, the analyst qualitatively and quantitatively considers each of these factors.

Table 1 on the following page presents some of the attributes that the analyst considers in the technology intangible asset valuation. Table 1 also provides an indication of how these attributes may influence the technology intangible asset value.

Not all of the Table 1 factors apply to every technology intangible asset involved in every eminent domain action, and each attribute does not have an equal influence on the technology intangible asset. However, the analyst typically considers each of these factors.

These considerations can be either quantitative or qualitative. They may be either separately documented in the analysis work papers or performed as one component of the overall engagement analysis. These considerations allow the analyst to assess the influence of these factors, either positive or negative, on the technology intangible asset value.

Some of the other factors that the analyst may consider include the following:

1. The legal rights associated with the technology intangible asset
2. The industry in which the technology intangible asset is used
3. The economic characteristics of the technology intangible asset
4. The reliance of the owner/operator on tangible assets or other intangible assets
5. The expected impact of regulatory policies or other external factors on the commercial viability or marketability of the technology intangible asset

Specific Factors to Consider in the Technology-Related Intangible Asset Analysis

The purpose for the analysis may influence the consideration of other individual factors. Factors that may be particularly relevant for one purpose—such as a business entity that is subject to an eminent domain action—may be more or less relevant for another purpose.

Assessing the Technology-Related Intangible Asset

An eminent-domain-related technology-related intangible asset analysis may involve the application of valuation principles and procedures. In the typical intangible asset analysis, the analyst may consider expected future income or estimate a reasonable royalty rate. In addition, the analyst could measure the cost to recreate the expected technology-related intangible asset.

There are a number of factors that the analyst may consider when measuring technology intangible asset value for eminent domain or other controversy purposes. Some of the factors that an analyst may consider in assessing the amount of reasonable compensation related to the technology intangible asset taking include the following:

- The calculation of the amount of income (however defined) that the intangible asset would have earned or contributed but for the eminent domain (or other damages) event (as compared to the amount of income that the intangible asset actually did earn or contribute after the influence of the eminent domain event).
- An analysis of the amount of income (however defined) that the intangible asset owner/operator will earn with the influence of the eminent domain event (as compared to a benchmark or yardstick level of income that the owner/operator would expect to earn without the influence of the eminent domain event).
- A quantification of the amount of income (however defined) decrease that the owner/operator experienced since the eminent domain event, where that decremental income is related to lost market share, lost market penetration, lost unit volume revenue, lost unit selling price revenue, increased production costs, increased selling costs, increased research and development costs, increased capital investment,

Table 1
Attributes That Influence the Value of a Technology-Related Intangible Asset Involved in an Eminent Domain "Taking"

Item	Attribute	Influence on Value	
		Positive	Negative
1	Age—absolute	Newly created, state-of-the-art technology	Long-established, dated technology
2	Age—relative	Newer than competing technology	Older than competing technology
3	Use—consistency	Technology proven or used consistently on products and services	Technology unproven or used inconsistently on products and services
4	Use—specificity	Technology can be used on a broad range of products and services	Technology can be used only on a narrow range of products and services
5	Use—industry	Technology can be used in a wide range of industries	Technology can be used only in a narrow range of industries
6	Potential for expansion	Unrestricted ability to use technology on new or different products and services	Restricted ability to use technology on new or different products and services
7	Potential for exploitation	Unrestricted ability to license technology into new industries and uses	Restricted ability to license technology into new industries and uses
8	Proven use	Technology has proven application	Technology does not have proven application
9	Proven exploitation	Technology has been commercially licensed	Technology has not been commercially licensed
10	Profitability—absolute	Profit margins or investment returns on related products and services higher than industry average	Profit margins or investment returns on related products and services lower than industry average
11	Profitability—relative	Profit margins or investment returns on related products and services higher than competing technologies	Profit margins or investment returns on related products and services lower than competing technologies
12	Expense of continued development	Low cost to maintain the technology as state-of-the-art	High cost to maintain the technology as state-of-the-art
13	Expense of commercialization	Low cost of bringing technology to commercial exploitation	High cost of bringing technology to commercial exploitation
14	Means of commercialization	Numerous means available to commercialize technology	Few means available to commercialize technology
15	Market share—absolute	Products and services using technology have high market share	Products and services using technology have low market share
16	Market share—relative	Products and services using technology have higher market share than competing products and services	Products and services using technology have lower market share than competing products and services
17	Market potential—absolute	Products and services using technology are in an expanding market	Products and services using technology are in a contracting market
18	Market potential—relative	Market for products and services using technology expanding faster than competing technologies	Market for products and services using technology expanding slower than competing technologies
19	Competition	Little or no competition for technology	Considerable established competition for technology
20	Perceived demand	Perceived currently unfilled need for the technology	Little or no perceived need for the technology

increased working capital investment, increasing cost of capital, or some other measure of lost profits.

- An analysis of the loss of the owner/operator's ability to be first-to-market, influence market prices, obtain patent or other legal protection, obtain regulatory approval, fulfill a contract or other commercial commitment, develop a replacement intangible asset, create or develop a replacement or improvement, or commercialize a replacement or improvement technology intangible asset. These analyses may be used to quantify the owner/operator's loss with respect to the eminent domain event.
- A projection of the amount of actual or hypothetical royalty income that the owner/operator will forgo as a result of the eminent domain event. That royalty income relates to the actual or hypothetical outbound license of the intangible asset (but before the intangible asset experiences any of the effects of the eminent domain event).
- The calculation of the amount of damages suffered by the owner/operator to date (for example, from the time the damages event first occurred through the date that the reasonable compensation analysis is performed).
- The calculation of the amount of the expected future damages suffered by the owner/operator (for example, from the eminent domain event date through the expected cessation of the effects of the eminent domain event).
- The estimation of the expected time period (for example, a specified limited period or an unspecified perpetuity period) duration of the damages.
- A consideration of the mitigation efforts of the owner/operator related to the eminent domain event.
- The estimation of the effect of the eminent domain event on the intangible asset's expected RUL.

If sufficient data are available, the analyst typically considers more than one valuation approach or method when eminent-domain-related reasonable compensation is measured as an intangible asset value decrease or a cost to cure.

In a reasonable compensation analysis, the analyst does not limit the examination to the valuation variables data that are available prior to the reasonable compensation analysis date. The analyst should be aware that the estimation of damages may be governed by the legal rules of the jurisdiction in which the eminent domain dispute is pending.

"[Remaining useful life] is a factor that the analyst typically considers in every intangible asset valuation."

The business entity owner/operator reasonable compensation is typically experienced during a distinct period of time. Therefore, the quantification of the intangible asset reasonable compensation may or may not be based on a perpetuity RUL projection.

Estimating the Technology-Related Intangible Asset RUL

RUL is a factor that the analyst typically considers in every intangible asset valuation. RUL considerations influence the analyses that are performed for valuation, reasonable compensation, and other purposes.

The analyst considers either a qualitative or a quantitative RUL analysis whether the analysis involves the income approach, cost approach, or market approach. RUL is a consideration in a technology-related intangible asset valuation performed for any purpose.

In an intangible asset reasonable compensation analysis, the owner/operator damages typically occur for a determinable period of time. The determinable time period affected by the eminent domain event may be different than the intangible asset RUL. When estimating the reasonable compensation amount, the analyst typically considers the damaged intangible asset's RUL.

One common component of the damages claim often relates to the technology intangible asset's RUL. That is, the owner/operator may claim reasonable compensation related to the shortening of the technology intangible asset RUL if that shortening is caused by the eminent domain event. This claim typically alleges that the intangible asset RUL is reduced due to the eminent domain action.

In the technology intangible asset valuation, RUL can influence the value conclusion. This statement is true regardless of which valuation approach is used in the analysis.

In the income approach, for example, the income producing potential of the intangible asset is directly influenced by the technology's RUL.

In the cost approach, the technology RUL typically influences the amount of obsolescence associated with the intangible asset.

In the market approach, both the intangible asset age and the technology RUL may be compared to the selected guideline intangible assets. This comparison is performed so the analyst can determine if (1) any adjustments are required to the guideline sale or license transaction pricing data or (2) a sale or license transaction should be rejected from further consideration (due to lack of age/life comparability) in the market approach analysis.

The analysis purpose (such as eminent domain reasonable compensation) may cause the analyst to consider different factors of intangible asset RUL. The intangible asset RUL is a factor to consider regardless of whether the analysis concludes to a value or reasonable compensation and regardless of the analysis approaches or methods used.

Illustrative Example

Exhibits 1 through 3 present an illustrative valuation of a trade secret intangible asset that is part of an eminent domain action.

The Flintstone Quarry Corporation (FQC) operates a stone quarry and a limestone manufacturing plan in the Town of Bedrock. The quarry and plant are located adjacent to the Bedrock Municipal Airport. The airport is expanding, and it needs the FQC property to construct additional (and longer) runways. The Town of Bedrock used its eminent domain authority to "take" the FQC property.

The Town of Bedrock and the business owner have agreed to the value of the FQC real estate and equipment. However, due to the taking, the FQC will have to close down its business operations. Therefore, the taking also includes the FQC business intangible assets. The town and the business owner cannot agree on the value of the FQC intangible assets—including the FQC technology-related trade secret intangible asset.

Accordingly, the FQC management retained a valuation analyst to measure the value of the company's trade secret—and, if needed, to provide expert testimony with regard to the appropriate amount of intangible-asset-related reasonable compensation.

The FQC trade secret intangible asset relates to the manufacture of a proprietary limestone product. The intangible asset includes the proprietary manufacturing process by which the limestone product is formed.

This example illustrates both a cost approach analysis and an income approach analysis regarding the technology-related intangible asset.

The intangible asset is the manufacturing process (referred to as "the process") of a particular limestone product manufacturing process. This process is documented in a set of engineering drawings and in a process flow chart notebook.

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

FQC 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.

FQC management also believes that the process gives the company's limestone product a distinct competitive advantage. This particular limestone product formulation is particularly attractive to customers in the oil and gas refinery industry. FQC marketing personnel stress this product differentiation feature in all of the company's marketing materials and presentations.

The intangible asset subject to the eminent domain action is the trade secret related to the particular product manufacturing process.

Fact Set and Analysis Assumptions

The analysis objective is to estimate the fair value of the trade secret intangible asset as of December 31,

2014. The analysis purpose is to assist a finder of fact in determining the appropriate amount of reasonable compensation due to the FQC owners due to the eminent domain action.

The alternative methods available for manufacturing such a limestone product include various equipment configurations that use different pressure temperatures, and consumable materials components that are used at the FQC plant in the Town of Bedrock. In fact, FQC uses these other processes at its other quarries.

However, the stone at the Town of Bedrock quarry has a unique chemical composition that allows the subject trade secret to be economically feasible. The combination of the FQC Bedrock quarry stone and the trade secret allow the Town of Bedrock plant to produce a unique—and extremely profitable—composition of limestone product.

To exploit the unique composition of rock at the Town of Bedrock quarry, the FQC process engineers developed a unique modification to the standard limestone manufacturing process.

Selection of Valuation Approaches and Methods

In this analysis, the analyst is instructed by the FQC legal counsel that the appropriate standard of value is fair market value. The premise of value is value in continued use. This premise of value is consistent with the valuation assignment and the analyst's assessment of the subject intangible asset's HABU.

There are several approaches and methods that the analyst considered in this valuation. Based on the quality and quantity of available data and the purpose and objective of the analysis, the analyst decided to use two valuation approaches:

1. The cost approach—specifically the replacement cost new less depreciation (RCNLD) method
2. The income approach—specifically the differential income method

Cost Approach

The cost approach typically involves estimating either a reproduction cost new or a replacement cost new. The reproduction cost new equals the cost to construct an exact replica of the technology-related intangible asset. The replacement cost new is the cost to recreate a new intangible asset with an equivalent utility of the subject intangible asset.

The analyst decided to use the RCNLD method of the cost approach to value the process trade secret. The analyst had access to the actual historical

development costs related to the process. This type of historical cost information is not always available.

Because this limestone product manufacturing process trade secret was so important to the company, FQC management tracked the original efforts related to its proprietary process development.

Valuation Variables

The analyst considered the historical efforts (in terms of person-months) of each process engineer, product engineer, scientist, researcher, and manager involved in the development of the trade secret.

After consultation with management, the analyst eliminated any duplicate or unproductive efforts from this person-month estimate. Therefore, the analyst eliminated much of the intangible asset functional obsolescence.

The analyst multiplied the current person-month by the current full-absorption cost related to that personnel position. The product of such a multiplication is the estimate of a replacement cost new (RCN).

Management provided the analyst with information regarding the actual number of hours spent by FQC engineers and scientists on the various aspects of the manufacturing process development.

In applying the RCNLD method, the analyst estimated a full absorption cost related to the employees who developed the process. This full absorption cost included all employee salaries, employee benefits, employment-related taxes, and related company overhead. This full absorption cost also included a component for development period interest related to the intangible asset direct costs.

The analyst calculated each of these full absorption cost components as of the valuation date. Based on this full absorption cost analysis, the analyst concluded the current cost per person-hour for all of the FQC company employee hours actually spent on

the development, testing, and implementation of the process trade secret.

The product of (1) the total number of person-hours actually spent to develop the process and (2) the full absorption cost per person-hour results in (3) an estimate of the RCN for the process trade secret.

To the extent that the intangible asset is less than an ideal replacement for itself, the RCN should be adjusted accordingly. The analyst considered adjustments to the RCN for losses in value due to incurable functional obsolescence and economic obsolescence.

In particular, the analyst considered (1) the intangible asset age and RUL, (2) the intangible asset position within its technology life cycle, and (3) the owner/operator's return on investment related to the intangible asset use.

Exhibit 1 summarizes the RCNLD analysis. The RCN includes direct costs, indirect costs, developer's profit, and entrepreneurial incentive.

The direct costs include the direct salary costs and the related employee benefit cost and employment taxes of the process development team.

The indirect costs include overhead allocation costs paid to outside consultants and development period interest expense.

The developer's profit includes the analyst's estimate of the profit margin that an independent engineering firm would charge to FQC if that engineering firm was retained to develop the proprietary process.

The entrepreneurial incentive is the opportunity cost related to the intangible asset development process.

In this analysis, the analyst quantified this opportunity cost as the difference in the amount of cash flow that FQC would earn with versus without the process. The analyst estimated that incremental cash flow during the period of elapsed time required to replace the process de novo. FQC engineers estimated that the development period required to reproduce the process de novo would be 24 months.

As indicated in Exhibit 1, the RCN for the process was $10,784,000. The analyst concluded that a 10 percent functional obsolescence allowance is appropriate. That 10 percent functional obsolescence allowance results in $1,078,000 of depreciation.

Accordingly, the indicated RCNLD estimate is $9,706,000. This RCNLD estimate is rounded to a fair market value indication of $9,700,000.

Valuation Analysis

As presented in Exhibit 1, the fair market value of the technology intangible asset based on the cost approach, as of December 31, 2014, is $9,700,000.

Income Approach

Using the differential income method, first, the analyst projected the prospective cash flow generated by FQC associated with the use of the process.

Second, the analyst projected the prospective cash flow that would be generated by FQC without the use of the 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 process in current operation).

Valuation Variables

FQC management provided the analyst with projections of the limestone 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 limestone product. Management prepared a five-year projection of the selling, general, and administrative expenses related to the limestone 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 differential income method, provides a supportable value estimate.

This valuation method measures the difference in the income potential of FQC both with and without the operation of the process trade secret. The income potential represents the amount of income that is available to the FQC 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 income measure.

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

	Net Sales
Less:	Cost of sales
Less:	Operating expenses
Equals:	Net income before taxes
Less:	Income taxes
Plus:	Depreciation and amortization expense
Less:	Capital expenditures
Less:	Additions to net working capital
Less:	Contributory asset charge
Equals:	Net cash flow

Exhibit 1
Flintstone Quarry Corporation
Limestone Product Proprietary Process
Technology-Related Intangible Asset
Cost Approach
Replacement Cost New Less Depreciation Method
As of December 31, 2014

	Total Person-Hours to Replace the Process	Average Base Cost per Person-Hour	Employee Benefits and Overhead Cost Allocation Factor	Full Absorption Cost per Person-Hour ($)	Replacement Cost New ($)
Type of Process Engineering Research & Testing					
Manufacturing Process Analysis	15,000	75	1.85	139	2,085,000
Product Formulation	8,000	75	1.85	139	1,112,000
Manufacturing Process Development and Testing	10,000	85	1.85	157	1,570,000
Manufacturing Process Drawings and Documentation	8,500	90	1.85	167	1,420,000
Total Direct and Indirect Costs [a]					6,187,000
Plus: Developer's Profit at 15% [b]					928,050
Plus: Entrepreneurial Incentive [c]					3,669,000
Indicated Replacement Cost New (RCN) (rounded) [d]					10,784,000
Less: Functional Obsolescence (at 10% of RCN, rounded) [e]					1,078,000
Equals: Replacement Cost New Less Depreciation (RCNLD)					9,706,000
Indicated Fair Market Value of Technology-Related Intangible Asset (rounded)					9,700,000

Footnotes:

[a] The full absorption cost allocation factor includes a component for development period interest.

[b] The developer's profit represents a fair profit margin that an independent engineering company would charge to a client like FQC to develop a manufacturing process like the process.

[c] The entrepreneurial incentive indicates the incremental amount of net cash flow that the owner/operator of the process will earn during the 24-month process development period--compared to the amount of net cash flow the same owner/operator would earn from using an alternative manufacturing process.

[d] This replacement cost new (RCN) estimate includes all related direct costs, indirect costs, developer's profits, and entrepreneurial incentive.

[e] The analyst concluded that a 10 percent functional obsolescence allowance was appropriate, due to the competitive nature of the subject limestone product. That is, FQC continually updates its manufacturing processes. And, management expects to develop and implement an improved process in a few years. Since this technology-related intangible asset is earning a fair return on investment, the analyst concluded that an allowance for economic obsolescence is not needed.

In this analysis, FQC management projected the product line net cash flow over the intangible asset'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 process in operation and without the process in operation equals the indicated value of the intangible asset.

Based on the its industry experience, FQC management expects that it will develop a replacement manufacturing process in about five years. Both FQC and its competitors continuously develop improved products that are produced by improved manufacturing processes.

The FQC process engineering staff is already working on the development of a new and improved process. FQC 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 process.

This five-year RUL is consistent with the company's historical experience regarding its process technology life cycle and with the competitor industry's historical experience regarding a limestone manufacturing process technology life cycle.

Accordingly, FQC management believes that it will enjoy another five years of competitive advantage in this product category due to its current proprietary process. The analyst selected five years as the process RUL.

The analyst selected the following valuation variables for this analysis:

Scenario I: With the process trade secret in current operation

- Net sales growth rate: 10 percent per year
- Gross margin percentage: 26 percent of net sales
- Other 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
- Contributory asset charge: $2.2 million per year
- Incremental net working capital: 5 percent of net sales
- Present value discount rate: 15 percent
- RUL estimate: 5 years

Scenario II: Without the process trade secret in current operation

- Expected sales decrement: –10 percent per year
- Other 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 is included to account for the fair rate of return of and on the investment of all the contributory assets that are used or used up in the production of the income associated with the process. The contributory assets include net working capital, tangible operating assets, and the trade name.

The projected decrease in product line sales without the process in operation is based on discussions with management. This projected sales decrease indicates the FQC management estimate of the customer response to the decrease in functional attributes of the company's limestone product without the process trade secret. The negative sales growth rate reflects the FQC management projection of the combined effects of decreased unit selling price and decreased unit volume sales.

Without the product differentiation provided by the process, FQC management estimates that it would have to increase its marketing expense. This marketing expense increase accounts for the one-half of one percent projected increase in other operating expenses.

In addition, FQC management projects that it would have to liberalize its customer credit policy in order to stimulate sales of the less desirable product. Management estimates that it would have to give 60-day credit terms instead of 30-day credit terms.

This expected change in credit policy would affect the company's accounts receivable balances. This change in credit policy would result in an expected 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 FQC weighted average cost of capital (WACC). The analyst concluded that this discount rate is appropriate for this analysis based on the selected net cash flow measure of income projected in the analysis and the stated standard of value and premise of value.

Valuation Analysis

As presented in Exhibit 2, the sum of the product line discounted cash flow with the process in operation is $49,500,000.

Exhibit 2
Flintstone Quarry Corporation
Limestone Product Proprietary Process
Technology-Related Intangible Asset
Income Approach
Differential Income Method
Scenario I: With the Process Trade Secret in Operation

Limestone Product Line Projection Variables ($ in 000s):	Year 1	Year 2	Year 3	Year 4	Year 5
Net Sales with the Proprietary Process in Operation	$ 146,912	$ 161,603	$ 177,764	$ 195,540	$ 215,094
Gross Margin	38,197	42,017	46,219	50,840	55,924
Operating Expenses	(16,160)	(17,776)	(19,554)	(21,509)	(23,660)
Earnings before Interest and Taxes	22,037	24,241	26,665	29,331	32,264
Income Tax Expense	(7,933)	(8,727)	(9,599)	(10,559)	(11,615)
Operating Income	14,104	15,514	17,066	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)
Contributory Asset Charge	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
Incremental Net Working Capital Investment	(696)	(735)	(808)	(889)	(978)
Net Cash Flow	11,208	12,580	14,058	15,683	17,471
Present Value Discount Factor [a]	0.9325	0.8109	0.7051	0.6131	0.5332
Discounted Net Cash Flow	10,451	10,201	9,912	9,615	9,315
Sum of Product Line Discounted Net Cash Flow (rounded)	49,500				

Footnote:
[a] Assumes a midyear discounting convention.

Exhibit 3
Flintstone Quarry Corporation
Limestone Product Proprietary Process
Technology-Related Intangible Asset
Income Approach
Differential Income Method
Scenario II: Without the Process Trade Secret in Operation

Limestone Product Line Projection Variables ($ in 000s):	Year 1	Year 2	Year 3	Year 4	Year 5
Net Sales with the Proprietary Process in Operation	$ 146,912	$ 161,603	$ 177,764	$ 195,540	$ 215,094
Expected Sales Decrement without Process	(14,691)	(16,160)	(17,776)	(19,554)	(21,509)
Net Sales without the Process in Operation	$ 132,221	$ 145,443	$ 159,987	$ 175,986	$ 193,584
Gross Margin	34,377	37,815	41,597	45,756	50,332
Operating Expenses	(15,205)	(16,726)	(18,399)	(20,238)	(22,262)
Earnings before Interest and Taxes	19,172	21,089	23,198	25,518	28,070
Income Tax Expense	(6,902)	(7,592)	(8,351)	(9,186)	(10,105)
Operating 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)
Contributory Asset Charge	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
Incremental Net Working Capital Investment	(876)	(926)	(1,018)	(1,120)	(1,232)
Net Cash Flow	9,194	10,371	11,629	13,012	14,533
Present Value Discount Factor [a]	0.9325	0.8109	0.7051	0.6131	0.5332
Discounted Net Cash Flow	8,573	8,410	8,199	7,978	7,749
Sum of Product Line Discounted Net Cash Flow (rounded)	40,900				

Footnote:
[a] Assumes a midyear discounting convention.

Exhibit 4
Flintstone Quarry Corporation
Limestone Product Proprietary Process
Technology-Related Intangible Asset
Income Approach
Differential Income Method
As of December 31, 2014

Sum of the Limestone Product Line Discounted Net Cash Flow:	Exhibit Reference	$ in (000s)
Scenario I: With the Process Trade Secret	2	$ 49,500
Scenario II: Without the Process Trade Secret	3	40,900
Proprietary Process Discounted Net Cash Flow Differential		8,600
Times: Tax Amortization Benefit Value Adjustment Factor (rounded) [a]		1.2
Indicated Fair Market Value of the Technology-Related Intangible Asset (rounded)		$ 10,100

Footnote:
[a] Tax Amortization Benefit Value Adjustment Factor =

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

As presented in Exhibit 3, the sum of the product line discounted cash flow without the process in operation is $40,900,000.

The difference between these two income projections indicates a discounted cash flow differential related to the process of $8,600,000.

As presented in Exhibit 4, the unadjusted discounted net cash flow differential is $8,600,000. However, this unadjusted cash flow differential does not consider the fact that this intangible asset would qualify as on Internal Revenue Code Section 197 intangible asset to the typical willing buyer of this intangible asset.

Since this valuation is intended to conclude a market value, the economic benefit related to Section 197 intangible asset tax amortization benefit (TAB) may be considered in the valuation.

An intangible asset that is amortizable for federal income tax purposes provides an income tax expense reduction (that is, a cash flow benefit) to the intangible asset buyer. That cash flow benefit is typically calculated as the present value of the expected reduction in future income tax expense due to the intangible asset amortization tax deductions.

The TAB value adjustment factor calculation follows:

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

The analyst applied the TAB value adjustment factor to the present value of the net cash flow differential associated with the intangible asset. The TAB factor was calculated based on:

1. the income tax amortization period for the intangible asset (15 years under Section 197),
2. the market-derived effective income tax rate of 36 percent, and
3. the present value discount rate of 15 percent.

Based on the TAB formula, the TAB value adjustment factor for this analysis is 1.2 (rounded). The discounted net cash flow differential of $8,600,000 times the income TAB value adjustment factor of 1.2 indicates the income approach value of the process.

As presented in Exhibit 4, the fair market value of the technology intangible asset based on the income approach, as of December 31, 2014, is $10,100,000.

Exhibit 5
Flintstone Quarry Corporation
Limestone Product Proprietary Process
Technology-Related Intangible Asset
Valuation Synthesis and Conclusion
As of December 31, 2014

Valuation Approach:	Valuation Method	Value Indication ($ in 000s)	Value Indication Emphasis	Value Conclusion ($ in 000s)
Cost Approach	Replacement Cost New Less Depreciation Method	9,700	50%	4,850
Income Approach	Income Differential Method	10,100	50%	5,050
	Fair Market Value of the Technology-Related Intangible Asset (rounded)			9,900
	Amount of Reasonable Compensation to FQC for the Intangible Asset Taking			9,900

Value Indications and Conclusion

The analyst decided to assign equal weight to the value indications provided by the two valuation approaches.

In synthesizing the results of the cost approach and the income approach, the analyst considered both (1) the quantitative and qualitative assessment of the data underlying each valuation approach and (2) the relevance of each valuation approach based on factors specific to the subject trade secret.

Based on the analyses presented in Exhibits 1 through 4, the fair market value of the FQC technology-related trade secret intangible asset, as of December 31, 2014, is $9.9 million (rounded).

Based on the quantity and quality of the information available for each valuation approach, the analyst applied a weight of 50 percent to each value indication to arrive at a final value conclusion for the trade secret intangible asset.

Accordingly, $9.9 million is the indicated amount of reasonable compensation to the FQC owners for the "taking" of its technology-related intangible asset.

Exhibit 5 presents the final valuation synthesis—and reasonable compensation conclusion—for this illustrative intangible asset valuation.

Summary

Going-concern business entities may be the subject of eminent domain and expropriation actions. In such a case, the business owner/operator should receive reasonable compensation from the governmental or municipal authority with eminent domain powers.

When the entire going-concern business is the subject of the taking, the amount of reasonable compensation may include the value of the entity's tangible assets and the value of the entity's intangible assets. These intangible assets often include the entity's technology-related intangible assets.

When analyzing a technology-related intangible asset, the analyst should consider the purpose and objective of the assignment as well as the relevant factors specific to the technology.

This discussion summarized the typical attributes of a technology intangible asset and the specific factors for an analyst to consider when assessing the technology intangible asset value or reasonable compensation.

Finally, this discussion presented an example of a technology-related intangible asset valuation. The example illustrated a cost approach method and an income approach method used to estimate the fair market value of a technology intangible asset—and the amount of reasonable compensation related to the taking of that intangible asset.

Notes:

1. Treasury Regulation Section 1.482-4(b).
2. Ibid., Section 1.482-4(a).

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