



**THE DEFINITIVE HOW-TO GUIDE
TO ESTABLISHING VALUES FOR PIPELINES**

BY DAVID HOWELL

PIPELINE APPRAISAL HANDBOOK

The Definitive How-To Guide To Establishing Values for Pipelines

a product of:

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Articles by David Howell on pipeline appraisal that have been published in various industry journals

- Forty Factors for Pipeline Appraisal (April 2010, Throughput Emag)
- Underground World of Pipeline Appraisal (May/June 2010, Right of Way Magazine)
- Proper Pipeline Valuation Requires Specialized Appraisal (May 2010, Oil & Gas Journal)
- What is the Value of Your Pipeline (May 2010, Pipeline Gas Journal)
- Determining Salvage Values of Vintage Pipelines (October 2010 Pipeline & Gas Technology)
- How to Recycle a Pipeline (May 2010, Throughput Emag)
- Pipeline Operators Underusing Potential Pipeline Rehabilitation (January 2010, Oil & Gas Journal)
- Markets and Reuses for Recovered Line Pipe (September 2010, Throughput Emag)

3. Articles

Articles about pipeline appraisal that have been published in Right of Way Magazine, the publication from the International Right of Way Association (IRWA)

- The Cost Approach in Corridor Valuation (January/February 2004)
- Valuing a Corridor Within a Corridor (March/April 2000)
- Valuing a Gas Pipeline Easement: Part One (September/October 1998)
- Setting a Value on Gas Pipeline Easements: Part Two (January/February 1999)
- Appraising Pipeline Easements: A Practical Approach (March/April 2008)
- Is That a Right of Way or an Easement...And Does It Really Matter? (September/October 1998)
- Appraisals of Pipeline Right of Way (June 1984)
- Appraisal and Uses of Abandoned Railroad Rights of Way (June 1981)
- Appraisal-May the Best Approach Win (July/August 2007)
- Basic Economic Tools of Right of Way Valuation (September/October 2001)
- Complexities of Pipeline Easement Damages on Midwest Farmland (November/December 2006)
- Bundle of Rights Theory Applied to Valuation of Easements and Rights of Way (January 1980)
- The Molding of Right of Way Appraisers (August 1970)
- Easement Valuation (May/June 2006)

- The Appraisal of Easements (November/December 2001)
- Ten Courtroom Commandments (October 1959)

4. Resources and Reviews

Review of books, websites, sources, and presentations about pipeline appraisals

- Corridor Valuation: An Appraisers Overview
- Uniform Standards of Professional Appraisal Practice
- Oil and Gas Pipelines in Non Technical Language
- pipelineknowledge.com
- IRWA Course 400: Principles of Real Estate Appraisal
- IRWA Course 403: Easement Valuation

5. References

Useful references for the pipeline appraisal industry

- Glossary of Pipeline Appraisal Terms
- Calculating the Weight Per Foot Per Pipe or Tubing
- ERW and Seamless Line Pipe Tables: Diameters, Weights, and Grades
- Physical Pipeline Properties

About This Handbook

This handbook is compilation of facts and guidelines for pipeline appraisal. This handbook provides general steps for researching a project and preparing a valuation report with a final value determination. This handbook assumes you are familiar with appraisals and appraisal terminology. If not, an extensive glossary is provided.

Several resources are provided in this handbook for the pipeline appraiser. In addition to an overview of the industry and general appraisal process, this handbook contains two sections of industry articles regarding pipeline appraisals. The first section of articles contains a compilation of articles that I have written and that have been published in various industry journals and publications. These articles contain accounts of actual cases and would most helpful for pipeline appraisers. The second section of articles provides articles about appraisals (mostly of easements and rights of way) from past issues of Right of Way Magazine, the official publication of the International Right of Way Association. The “Resources and Reviews” section is unique as it not only provides sources of information, but also reviews the significance of each source to the pipeline appraisal industry. The “References” section provides the aforementioned Glossary as well as pipeline diameter tables, help in calculating pipeline weight, as well as references about the physical and chemical properties of pipelines.

1. Pipeline Appraisal

The Business of Pipeline Appraisal

The Uniform Standards of Professional Appraisal Practice (USPAP, 2003) describes an appraisal practice as “Valuation services performed by an individual acting as an appraiser, including but not limited to appraisal, appraisal review or appraisal consulting”, while an appraiser is “a person who performs valuation services competently in an independent, impartial, and unbiased manner.” The business of pipeline appraisal might be more accurately described as “pipeline asset valuation”. Among real estate professionals, this term is better accepted so long as there is no real estate play or discussion. Pipeline appraisal does have some real estate to be considered in the right of way or easement area, but typically this area does not make up more than five to ten percent of the total valuation.

Until 1990, the core business of Pipeline Equities was pipeline salvage. Through our TRADEX Magazine as a tool for brokering equipment and pipe, our company had operated primarily in the area of buying and selling down-hole pipe and tubing as well as oil field drilling and production equipment. We moved toward pipeline recovery and salvage when oil went to \$10 a barrel in the 1980's and found a niche market in digging up out-of-use pipelines that had outlived their usefulness as transporters of crude or gas, at least in the locations they were buried. We found that owners and operators were glad to get anything for what they considered rusting and deteriorating steel. Letters were written to these identified pipeline operators offering to pay for their uneconomic and out-of-use pipelines, dig them up, and record the right of way back to the landowners at our expense.

Eventually, gatherers and operators of pipelines began asking what a pipeline might be worth under certain circumstances and we would provide them an official valuation, always with the hint or promise of the offer for that pipeline or another. The operator would then take the valuation to an appraisal district to get the pipeline value reduced for tax purposes. It was only a short time before we

started to charge for these valuations. At the time, our valuations were based on salvage values only, and the lines we looked at were usually idled or abandoned as far as regulatory agencies were concerned. This was the start of Pipeline Equities' version of pipeline appraisal.

The direct mail marketing continued with the core always to find pipelines to salvage, but we started to incorporate our appraisal service for estate settlement and ad valorem tax adjustments. Business began to pick up and diversify, and soon we learned to value operating systems by throughput and apply replacement costs to the value of vintage as well as newer systems.

Today we do appraisal reports for clients seeking to sell properties, buy properties, lower taxes, and settle estates. We have appraised pipeline properties for banks and other lenders prior to making loans based on values and appraisals on preconstruction of pipelines. This type of preconstruction appraisal was feasible when all costs and revenues were fixed and contracts were in place for the purchaser (of the transported product) the seller (source of supply) and the contractor who was to build the pipeline.

Pipeline appraisal is a niche industry and little known except to the users: accounting and financial officers and those of us who do the work. Today, there are an estimated twenty individuals in the country qualified and dedicated to pipeline appraisal. There are several accounting or CPA firms and a good many easement appraisers who might sometimes call themselves pipeline appraisers, but in reality, they are real estate appraisers who are much more comfortable condemning rights of way for power lines or highways. You can bet the approach they use is based on the "cost of replacement new" appraisal method and then depreciated. This is the method the Marshall and Swift supermarket of asset value uses for all purposes, and it is the general practice of those outside the pipeline industry as well.

Initially in any appraisal, there is an approach by the client for a particular type of appraisal. The client and appraiser will come to terms as to the cost and time of

delivery. I strongly suggest an engagement letter signed by both parties before any work is done. Also, it might be prudent to ask for a deposit depending on the client and if there is any prior engagement history.

Research of the subject follows. Gather all you can from the client. The client usually has access to more data than he or she is aware of. Collect copies of contracts, pictures, maps, operating data, construction information, bids, revenue statements, expense reports, tax obligations, client lists, etc. Get it all! This is your backup data, and you will include all or some of the information in the appraisal report.

Find out which appraisal approach detailed in this handbook is best suited for the project. You will know early on as you gather data. Generally in pipeline appraisal, you will use several appraisal methods such as income capitalization, construction cost new, sales comparison, salvage value, right of way value, to arrive at the final valuation. Many times we use a combination of methods include salvage values. The right of way value is included and the “At the Fence” or “Across The Fence Method” is used if no comparable right of way sales are available or a going price for right of way has not been established. If you are a novice, I want to emphasize the importance of using the glossary to familiarize yourself with appraisal and right of way terminology.

Factors for Determining Value

Appraisal methods vary from one approach to another, but the end result on the pipeline valuation is not significant. Our method of valuation for easements is usually a sales comparison or a more traditional method determining what the going price is in the area. An across the fence (ATF) method can be used as well; however, the impact on the final appraisal value is insignificant.

Parts of the following examples for value determination or approaches for determining value are based on *Oil & Gas Pipelines in Non Technical Language*

by Thomas O. Miesner and William L. Leffler. For more information about this book, see the “Resources and Reviews” section.

Economic Value

Forecast future income by way of anticipated streams of cash flow and discounted to reflect the value today to establish a sales or purchase price. Receiving \$1 today is worth more than getting it five years later. Therefore discounting future cash flow by a factor equivalent to interest rates allows a comparison of present and future values. The method is one of determining net present value (NPV).

Multiplier

A rapid way of determining value and one much in use today is that of using a variation of cash flow methods and multiplying that factor by five to twelve times. The multiplier can depend on many other factors. For more information on the multiplier method, see *Forty Factors for Pipeline Appraisal* in the “Pipeline Articles by David Howell” section.

Comparable Sales

There are really no two pipelines alike. The comparable sales technique works well with residential and commercial real estate, but not in the pipeline business. The comparable sales approach does work for easements and rights of way which might make up as much as 5-7% of the total evaluation of a project.

Highest and Best-Use

Highest and best-use concerns the land, not the owners or buyers of property. The business value of the property (pipeline) is outside the scope of “highest and best use” Rahn in Corridor Valuation. This book is reviewed in the Review and Resources section of this book.

So the highest and best use involves the fixture or pipe in place. The highest and best use of the ditch so to speak might be to use it for a 20" crude line instead of a 6" gas line.

Construction Cost New

Construction cost or Reconstruction cost new or replacement cost is the cost of rebuilding the same pipeline. The method could be a good check point against an asking price to see if the asking price is too much. It is also a method of determining value base on today's construction price less depreciation to come to a value of an older pipeline. It is difficult to determine as we don't always know the economic life of a pipeline. County and district appraisers might figure a 30-40 year life, but I have seen pipeline in good operating condition that have been in service for 50-70 years.

Book Value

This method is used only by sellers to determine what their gain or loss might be on a sale. It has no relevance to a purchaser.

Additional Valuation Factors

The following factors are not appraisal methods, but warrant consideration in determining values in pipeline valuation when present.

Throughput value (transportation)

This method can be used to value based on revenue and can be incorporated into a multiple approach, net revenue approach, or forms of discounted cash flow (income).

Depth of coverage or pipe

Depth of coverage or pipe is often associated with age. Often age and condition can be somewhat ascertained when depth is known and date of installation is not.

Right of Way agreements

Right of way agreements tell much about value. It is basically the legal instrument that determines the conditions by which a pipeline can be laid, width of right of way, maintenance conditions, repair conditions, term of contract, disposition of assets on termination of usage, or term in contract, etc.

Replacement Value (asset)

The replacement or cost basis is determined by the cost of replacing this same pipeline either on today's cost basis or on a depreciated basis.

Salvage Value

Salvage is determined by what material can be sold as in another venue; taken out of the ground and sold for the steel tubes or scrap value. In this way the pipe is treated as a commodity or secondary tubular steel.

Supply (other pipelines in area/scarcity)

Supply is where the product comes from to feed the pipeline. Are there other pipelines to take the product? Are there other sources of supply? What is the life expectancy of the source for the supplier?

Demand (potential buyers)

Is there sufficient demand to maintain or lay a pipeline? Is the demand stable and reliable? Is there room for future expansion with the demand group of buyers or transporters?

Customer Value

In the area of local distributors, a per customer value is sometimes applied. This value can vary from one local to another depending on demographics and economics of the area: whether it is urban or rural, high or static growth, etc. A major factor can be number of industrial or commercial customers such as restaurants, schools, plants that consume gas in manufacturing, etc.

Surface Inventory (including appurtenances)

Generally pipelines are bought and sold including appurtenances which are all valves, risers, meters, and anything else connected to the pipeline that is part of it and contributes to its operation. This can include tanks storage facilities and terminals.

Sales Contracts / Length

If the pipeline depends on a certain customer, or group, then it is important to know the term of the sales contract.

Potential for Replacement Volume (new wells, tie ins)

The potential for new customers is worth noting. If there is room for growth and the potential or possibility of new growth, then it could affect the premium or discount values

Type of System: Oil & Gas, Product, etc.

The type of system is significant for various reasons whether it be gathering, trunk, transmission, liquid, product, gas, or whatever.

Size of pipe

Size of pipe helps determine salvage as well as whether or not the pipe must be removed on termination of usage, etc. Mainly, size determines volume that can be transported and thus revenue potential.

Specification of Pipe

Specifications are important when determining value regarding salvage as well as dictates type of product and pressures that can be operating while the line is in service

Management (Front and Field offices)

Management can make or break any business, pipelines included.

Date of Installation

Dates are key as they determine and reveal the vintage of the pipe, coating, type of construction, and environmental considerations.

Maintenance of Property

Care and maintenance reveal the type and attitudes of management and the company as well as general conditions. Most pipelines are buried and the appurtenances above ground reveal much of the overall care to a property.

Interconnects

The interconnects are different as they are considered a separate asset and not an attachment or appurtenance to the pipeline even though it is or has become part of the system. We consider it separately and value accordingly varying from one to another.

Cathodic Protection

This corrosion protection of last resort is significant and the degree to which it is maintained is important. Conditions change and can affect the efficiency of any system especially in rapid growing and transitional areas.

Pipe Coatings (Vintage)

Pipe coatings reveal age and sometimes the type of construction and vintage of pipe. Knowledge of pipe coatings is important because this is the first line of defense against corrosion. Often older pipelines present environmental concerns as they have asbestos fiber embedded.

Environmental Concerns

This becomes a maintenance issue as much as anything as concerns center mostly around releases (spill, leaks) and what the oil, or any other kind of product might be transported

Demographics- Urban or Rural?

Pipelines in and out of cities and in the path of rapidly expanding areas of the country pose different sets of problems and generally require more maintenance than pure rural and thus can add significantly to overhead and upkeep as well as create higher tax rates by some appraisers.

Appurtenances (other than surface inventory)

Often there is forgotten the fee land that is acquired with a pipeline. In many situations real estate of value is part of a system but not recognized for its value as an entity by itself. Others might include loading docks at terminal especially docks on important water transportation corridor (Intracoastal Canal, Mississippi River).

Appearance

Curb appeal is importance in buying or selling a pipeline as it is in buying and selling any kind of property. The appeal of any property is always enhanced by well maintained and clean, well kept appearances.

Reservoir Studies

Reservoir studies are important when any system is dependent of a particular field or reservoir that feeds the pipeline system. It is important to know the life of the pool that is being depleted.

Market Price of Commodity

The price of the commodity determines the activity. Current high prices encourage much activity. When prices were lower, pipelines did not change hand very often for lack of motivated buyers.

Type of System: Trunk, Gathering, Distribution, etc.

The type of pipeline system is significant because each has its own set of peculiarities. Gas distribution companies deal with retail customers; Oil pipelines generally require more operations personnel than gas transmission, etc.

Chemical Content of Transported Product (H2S, CO2)

Aside from the obvious such as H2S and CO2 there are the myriad other chemicals, residues, and contaminants that are part of the process of eliminating cleaning and disposing of to some degree or another for safety as well as environmental reasons.

Market Diversity

Does the transporter have any diversity or opportunity to sell to more than one designated buyer?

Proximity to Markets

How far is the distance from the source to the market? Is there room for competition? Could another line be built economically to compete?

Geography

Geographical considerations can determine construction costs and when factoring in terrain, drainage, rivers, streams, and elevations.

River Crossings

One or more river crossings on right of way can add asset base and value to a pipeline

Diversity of Suppliers

Is there another supplier on the horizon in case the current source changes in any way. What is the stability of the current supply?

Regulatory Oversight or Governmental Factors

What kind of oversight. Is this a state regulated pipeline, FERC. To what agency does management report?

Social Factors

These can relate broadly to demographic characteristics of the area of the pipelines: age and gender composition, population, and social attitudes

Economic Factors

This can relate to employment cost of money, inflation, rent levels, possible new development, and construction costs in an area.

Transportation

Is area accessible for new construction, maintenance, and repair?

Ultimately, as Meisner and Leffler point out, buyers want to pay less, and sellers want a higher price. These two parties determine the final number regarding what a property is worth.

Sample Valuations

The following valuation samples show actual valuations from various appraisal reports.

IV. Summary of Data

Valuation Factors for Pipeline System	
Item	Amount
Right of Way Value	\$ 234,960.00
Replacement Costs of Pipeline	\$3,478,000.00
Salvage (subsurface) - Buried pipe net value after expenses	\$ 686,688.00
Surface Inventory Value	\$ 35,000.00
Throughput Value of Pipeline	\$5,078,823.00
Contracts	not applicable
Production life estimates	not applicable

IV. Summary of Data 58

This example shows the income or multiplier type approach for the throughput value, but also includes, salvage, replacement cost new and right of way value. We concluded the appraisal by adding the throughput value to the salvage value and estimated the system to be worth \$7,000,000.00.

X. VALUATION OF PIPELINE

The following methods for establishing value for the Project were used.

CONSTRUCTION/RECONSTRUCTION COST

Construction cost or reconstruction (replacement) cost for the newly constructed pipeline based on current cost and bids as of December 17, 2009:

Laying of pipe by Contractor (21,000' @ \$32.24 per foot).....	\$677,140
Right of way cost (acquisition, permits, fees, surveys)	\$199,920
Pipe coating and transportation (21,000' @ \$10 per foot)	\$210,000
Refinery connects	\$250,000
Equipment and installation: control system, pump station	\$130,000
Engineering Expense	\$60,000
Total Construction/Replacement Cost.....	\$1,527,060

OPERATING INCOME

For this valuation, the operating income is based on annual returns (furnished by the client) over a ten year period (the life of the contract with).

Approximate annual operating income (based on furnished contracts and projections).....	\$442,000
Contract Lifetime (10 years) operating income.....	\$4,420,000

CONCLUSION

To calculate the value of the Project, the two valuation methods were combined by using the contract lifetime operating income (\$4,420,000) minus today's construction/reconstruction cost (\$1,527,000). The Project value is **\$2,893,000.00**. This is a conservative valuation of this property.

This example is based on the new construction cost primarily plus the stated throughput as the client had a supply contract in hand and a purchase contract in hand with a ten-year time frame in the contract.

V. Valuation of Pipeline

A. Corridor/Right of Way Value

	Value per foot
53,000' Right of Way	\$3.00 to \$5.00

B. Pipeline Value

	Value per foot (\$)	Weight	Weighted Value (\$ per foot)
Replacement Value	6.25 to 8.75	50%	3.125 to 4.375
Salvage Value	0.50	50%	0.25
Total Weighted Pipeline Value per foot			3.38 to 4.63
Rounded			3.40 to 4.60

C. Total Value

	Value per foot (\$)
Corridor Value	3.00 to 5.00
Pipeline Value	3.40 to 4.60
Total Value	6.40 to 9.60

The third example shows only the right of way and the salvage value as there was no throughput in this out-of-service pipeline. The client desired to know what to offer for this piece of property.

Report Contents

A thorough appraisal report should include a description of the project, scope of work, purpose of the appraisal, explanation of methods used, and an evaluation of the management responsible for the project. Typically a table of contents might look like the following:

1. Overview and Scope of Work
This section explains the desires of the client and why the appraisal was requested.
2. A Brief History of Steel Pipelines
This section provides clients that are new to the industry more background information about the pipeline industry.
3. Summary Description of the Company and Asset
This section provides a historical snapshot of the company associated with the subject property and what it has done to this point and describes the subject property in detail.
4. Investment and Project Analysis
This section provides the dollar amount needed and the type of return expected. Essentially it is the business plan for the subject property.
5. Overview of Project
This section provides a summary of the project involving the subject property from conception to expected end and incorporates areas not addressed previously.
6. The Company and Profile Overview
This section provides more information about the company involved with the subject property and its vision for where it has been and where it is going based on the project, business plan and other factors covered to this point.

7. Management Analysis

This section provides an introduction to upper level management involved in the project. This section looks into their resumes and experience in the industry as well as management style and execution.

8. Report of Economy and Industry

This section provides the setting and business climate of the area where the pipeline is located and the local economic climate.

9. Process for Determining Value

After laying the groundwork in the prior sections, this section examines the various appraisal methods or approaches and settles on the one or combination that is used in the valuation of the subject pipeline.

10. Valuation of Subject Pipeline

This section contains the valuation result. This wraps up the report and gives the essence of the appraisal. This is the section every client goes to immediately when given a copy of the report

11. Exhibits

This section provides the proof or background information gathered in the valuation process. This includes most research materials, photos, references, maps, resumes, etc. obtained from the client or other parties and used in arriving at the valuation result.

12. Professional Qualifications of Author

Certifications, resume, and other qualifying documents of the appraiser employed for the report.

Site Visits

Always visit the subject property. Even if the subject property is a buried pipeline and the only thing to see is the right of way or easement, a site visit is a must. A site visit allow you to document things that could affect the appraisal such as a

highway expansion, a sub-division being prepared, a pond over the right of way, and other encroachments that a right of way agent or supervisor might have missed. Site visits allow you to document the property with photos of the subject pipeline, right of way, appurtenances, and surrounding areas for inclusion in your final report. Ensure that you take high definition photos which most digital cameras have the ability to do. In the rare instance that a site visit is not required, include a generic stock photo if you cannot locate any pictures of the subject property.

Summary

A look back at the table of contents for this document will show an articles section treating several different forms of appraisal and summarizing the various factors we use for determining value in oil, gas and products pipeline both active and idled. In section 2 will be a series of articles from past editions of International Right of Way Magazine and then an extensive glossary of terms used in and sometimes peculiar to our industry and to the appraisal industry. Don't dismiss the glossary and a dictionary or list of words. There is important terminology in that section that will help you understand the mechanics of the industry.

My favorite is the book review section that is more of a teaching summary of what and how to do according to professional appraisers and the formal terminology they use in evaluations. This will serve as a bibliography of sorts. So it seems what is left is just another appraisers opinion with facts available for someone else to look over and draw their own opinion and conclusions.

2. Pipeline Appraisal Articles by David Howell

40 Factors for Pipeline Appraisal

by David Howell, Senior Right of Way Agent,
International Right of Way Association



Many right of way appraisers rely on the “across-the-fence” (ATF) method to assign value to a particular right of way. The ATF method suggests that the right of way is worth whatever the surrounding land is worth. This method is popular, but only accounts for the value of the land itself. It does not take into account the value of the entity that uses the right of way, especially when it comes to right of way segments that contain pipelines. Typically, an easement or right of way contributes 5% to 7% of the cost of a building a pipeline and is not a large factor in the value.

Pipeline Equities saw the need to find methods of appraisal that are suited specifically to the pipeline industry. The need for pipeline appraisals came about initially when a discovery was made of the overvaluation of pipelines by local taxing authorities as well as overvaluation (and undervaluation) of pipelines involved in mergers, acquisitions, or estate settlements.

A valuation report concerning active or inactive oil, gas, or product pipeline may be needed for the following reasons:

- Preparing for a sale or divestiture
- Readjusting state, local, ad-valorem taxes/tax assessments
- Estate settlement
- Partnership termination
- Preparing for a purchase or acquisition
- Determining salvage value
- Preparing for pipeline use conversion
- Establishing value for accurate accounting

Methods of Appraisal

Pipeline Equities uses a combination of various methods to determine the value of a pipeline.

Market Analysis

Market analysis utilizes comparable sales histories. This works well for valuing land and housing, but each pipeline is so different that a method of comparable sales is not so useful. Because land and houses are plentiful, making commodities of land or houses is much easier than making commodities of pipelines. However, this method is still useful to get an overview by looking at sales histories of comparable pipelines in varying circumstances and locales in order to get some ideas in broader areas of comparison such as urban versus rural, California versus Mississippi, gas versus crude, and regulated versus non regulated pipelines. This factor is also called comparable analysis and is the primary tool for determining pipeline right of way values as opposed to the Across the Fence or ATF method used by real estate appraisers for valuing road and power line easements.

Highest and Best Use

Highest and Best Use is not best applied to pipeline evaluation; however, on occasion when pipelines are being valued for usage change, this method can be useful to establish the value of the existing pipeline and the cost of converting it for another use. Pipelines can be converted from crude product pipeline to fiber optic conduits or conduits for electric power line cables from wind farms electric grid centers. For the most part, pipelines are best used for the intent constructed. In the approach using highest and best use, it is better to combine the valuation with some of the forty factors such as size of line, geography, terrain or right of way values. An example might be that the highest and best use for a six-inch gas line might be to change it out for a ten-inch crude line using the same right of way if the contract permits the replacement.



Multiple lines in a right of way corridor.

Seller Determined Need

This method is used if the seller wants to record financial gain or loss from a sale use book value. It is not of much use to a purchaser since it has no relevance to current worth. Basically, the book value might be generated by the accounting of the seller or owner of the property, in whatever means the company accounting might use to determine the book value. It might be based on one or the other methods of determining value such as construction cost new and discounted, for example, but generally this book value designation by the seller has no relevance to the value as far as the purchaser is concerned.

Income Base or Cash Flow

This method is a popular means of establishing value for pipelines if they are generating or will generate a predicted cash flow. This method takes into account forecasted income based on throughput volumes and rates of the commodity transported. Expenses based on a historical or projected income stream are discounted. Another variation of this method uses multiples of current cash flow where the average annual cash flow is multiplied by a factor of five to twelve. This can be done on annual or monthly basis much like values of oil and gas royalties are determined. Many like to compare pipeline values to oil and gas

mineral interests regarding value. Both can have an indefinite life and both can be reborn as new drilling or new discoveries are made in and area. These additional income streams can be discounted to find a present day value or Net Present Value (NPV) in some cases when using future multiples or income. For example, the future income after operating expenses of a gas pipeline might be \$200,000 per year. A reasonable value might be five times that amount or \$1,000,000. A buyer might determine that the net present value in dollars paid today might be 20% less than the \$1,000,000 or \$800,000 Net Present Value in today's dollars.

Construction Cost New

Construction cost new or replacement cost is the cost of rebuilding the same pipeline in the same size, same manner, and same (or comparable) easement. This is an important factor in placing value on a pipeline to be considered by a purchaser. This approach also can be discounted. An example would be in determining the value of a pipeline that has been operating for ten years after it was initially installed. The line might have an expected life of forty years. It could be discounted 2.5% per year of life or a total of 25% off the cost of new construction in today market.

Each of the above methods can be employed to determine value for a property if the occasion calls or a combination of all can be used. We have found that value occurs with the interaction of demand for the property, utility of the property, scarcity or supply of the property, and ready transferability of ownership rights.

Customer Value

In the area of local distribution, a per customer value is sometimes used to realize value for a system. This per customer value is assessed on an individual basis and varies depending on whether the system is in an urban or rural area, high or static growth and other demographic factors. Greater multiples are used for commercial and industrial customers than residential. Residential customers might be valued individually from as little as \$400 in a low use slow growth area to as much as \$2000 in a high use high growth area.

Factors for Determining Value

In addition to these methods, several factors must be considered when assigning value to a pipeline. Pipeline Equities uses as many as 40 different factors to make our value determinations regarding pipelines. These factors cover the more technical aspects of business, physical, property, and commodity value. Some of these regarding pipelines might include:

- **Throughput Value (transportation).** This method can be used to value based on revenue and can be incorporate into a multiple approach, net revenue approach, or forms of discounted cash flow (income).
- **Depth of Coverage or Pipe.** Depth of coverage or pipe is often associated with age. Often age and condition can be somewhat ascertained when depth is known and date of installation is not
- **Right of Way Agreements.** Right of way agreements tell much about value. It is basically the legal instrument that determines the conditions by which a pipeline can be laid, width of right of way, maintenance conditions, repair conditions, term of contract, disposition of assets on termination of usage or term in contract, etc, etc.
- **Replacement Value (asset).** The replacement or cost basis is determined by the cost of replacing this same pipeline either on today's cost basis or on a depreciated basis.
- **Salvage Value.** Salvage is determined by what material can be sold as in another venue; taken out of the ground and sold for the steel tubes or scrap value. In this way the pipe is treated as a commodity or secondary tubular steel.
- **Supply.** Where does the product come from to feed the pipeline? Are there other pipelines to take the product? Are there other sources of supply? What is the life expectancy of the source for the supplier?
- **Demand (potential buyers).** Is there sufficient demand to maintain or lay a pipeline? Is the demand stable and reliable? Is there room for future expansion with the demand group of buyers or transporters?
- **Customer Value.** In the area of local distributors, a per customer value is sometimes applied. This value can vary from one local to another depending on demographics and economics of the area: whether it is urban or rural, high or static growth, etc. A major factor can be number of industrial or commercial customers such as restaurants, schools, plants that consume gas in manufacturing, etc.
- **Surface Inventory.** Generally pipelines are bought and sold including appurtenances which are all valves, risers, meters, and anything else connected to the pipeline that is part of it and contributes to its operation. This can include tanks storage facilities and terminals.
- **Sales Contracts/Length.** If the pipeline depends on a certain customer, or group, then it is important to know the term of the sales contract.
- **Potential for Replacement Volume (new wells, tie ins).** The potential for new customers is worth noting. It there is room for growth and the potential or possibility of new growth then it could affect the premium or discount values

- **Type of System: oil & gas, product, etc.** The type of system is significant for various reasons whether it be gathering, trunk, transmission, liquid, product, gas, or whatever.
- **Size of pipe.** Size of pipe helps determine salvage as well as whether or not the pipe must be removed on termination of usage, etc. Mainly, size determines volume that can be transported and thus revenue potential.
- **Specification of pipe.** Specifications are important when determining value regarding salvage as well as dictates type of product and pressures that can be operating while the line is in service
- **Management (front and field office).** Management can make or break any business, pipelines included.
- **Date of Installation.** Installation dates are key as they determine and reveal vintage of the pipe, coating, type of construction, and environmental considerations as of the date of installation.
- **Maintenance of Property.** Care and maintenance reveal the type and attitudes of management and the company as well as general conditions. Most pipelines are buried and the appurtenances above ground reveal much of the overall care to a property.
- **Interconnects.** The interconnects are different as they are considered a separate asset and not an attachment or appurtenance to the pipeline even though it is or has become part of the system. We consider it separately and value accordingly varying from one to another.
- **Cathodic protection.** This corrosion protection of last resort is significant and the degree to which it is maintained is important. Conditions change and can affect the efficiency of any system especially in rapid growing and transitional areas.
- **Pipe coatings (vintage).** Pipe coatings reveal age and sometimes the type of construction and vintage of pipe. Knowledge of pipe coatings is important because this is the first line of defense against corrosion. Often older pipelines present environmental concerns as they have asbestos fiber embedded.
- **Environmental Concerns.** This becomes a maintenance issue as much as anything as concerns center mostly around releases (spill, leaks) and what the oil, or any other kind of product might be transported
- **Demographics - urban or rural?** Pipelines in and out of cities and in the path of rapidly expanding areas of the country pose different sets of problems and generally require more maintenance than pure rural and thus can add significantly to overhead and upkeep as well as create higher tax rates by some appraisers.

- **Appurtenances (other than surface inventory).** Often there is forgotten the fee land that is acquired with a pipeline. In many situations real estate of value is part of a system but not recognized for its value as an entity by itself. Others might include loading docks at terminal especially docks on important water transportation corridor (Intracoastal Canal, Mississippi River).
- **Appearance.** Curb appeal is importance in buying or selling a pipeline as it is in buying and selling any kind of property. The appeal of any property is always enhanced by well maintained and clean, well kept appearances.
- **Reservoir Studies.** Reservoir studies are important when any system is dependent of a particular field or reservoir that feeds the pipeline system. It is important to know the life of the pool that is being depleted.
- **Market Price of Commodity** The price of the commodity determines the activity. Current high prices encourage much activity. When prices were lower, pipelines did not change hands very often for lack of motivated buyers.
- **Type of System: Trunk, Gathering, Distribution, etc.** The type of pipeline system is significant because each has its own set of peculiarities. Gas distribution companies deal with retail customers; Oil pipelines generally require more operations personnel than gas transmission, etc.
- **Chemical Content of Transported Product (H₂S, CO₂).** Aside from the obvious such as H₂S and CO₂ there are the myriad other chemicals, residues, and contaminants that are part of the process of eliminating cleaning and disposing of to some degree or another for safety as well as environmental reasons.
- **Market Diversity.** Does the transporter have any diversity or opportunity to sell to more than one designated buyer?
- **Proximity to Markets.** How far is the distance from the source to the market? Is there room for competition? Could another line be built economically to compete?
- **Geography.** Geographical considerations can determine construction costs and when factoring in terrain, drainage, rivers, streams, and elevations.
- **River crossings.** One or more river crossings on right of way can add asset base and value to a pipeline
- **Diversity of Suppliers.** Is there another supplier on the horizon in case the current source changes in any way. What is the stability of the current supply?
- **Regulatory Oversight or Governmental Factors.** What kind of oversight. Is this a state regulated pipeline, FERC. To what agency does management report?

- **Social Factors.** These can relate broadly to demographic characteristics of the area of the pipelines: age and gender composition, population, and social attitudes
- **Economic Factors.** This can relate to employment cost of money, inflation, rent levels, possible new development, and construction costs in an area.
- **Transportation.** Is area accessible for new construction, maintenance, and repair?

Other factors depend on whether product is purchased at the wellhead and resold, whether and to what extent the product is compressed, enhanced, treated, cleaned, or processed and by what procedures.

Recent Appraisals

Pipeline Equities has had several recent opportunities to appraise pipelines for a variety of purposes.

Appraisal for Pipeline Rehabilitation

Pipeline Equities recently appraised a vintage crude pipeline in a mature field on the West Coast. The line had been active in the past and later idled. The operator had intentions of rehabilitation and reactivation of the line and needed a fresh appraisal to help determine transport fees or tariffs as a common carrier. It was necessary to estimate the new construction price as well as depreciation and account for rehabilitation costs. We found the appreciation of the right of way costs in the heavily congested area more than made up for any deficiency in depreciated new construction costs.

Appraisal for Construction Financing

A bank contacted Pipeline Equities to obtain an appraised value for a pipeline to be built that would transport jet fuel to an airport. The bank wanted to know the value of the proposed pipeline before financing the construction cost. In place were the contract (long term), a firm bid for construction (construction cost new), and competent experienced management.

Appraisal for Pipeline Divestiture

A hedge fund made a decision to exit the pipeline business and sought Pipeline Equities for an appraisal of hundreds of miles of their active and inactive gathering and transmission pipelines. They needed to determine the value of the pipeline network in order to divide interests among investors. Pipeline Equities was able to use multiple methods including salvage to come to an equitable value

to which all parties agreed. Many of the gathering lines had no discernable easement by which a right of way only method like the ATF method could be used.

Appraisal for Tax Authorities

We have had many instances where a pipeline or gathering system was built for a new field with flush production and the field now is nearing depletion. The operators still must pay regular taxes where applicable according to earlier throughput or initial values, which were generally not depreciated. Local and state taxing authorities want up-to-date appraisals if they are to lower rates. Many local tax appraisers use only construction cost new methods with no regard for throughput generally via abbreviated Marshall and Swift formulas (Marshall and Swift is a commercial database of information, which is like a supermarket for almost any kind of asset valuation. The data is offered on a subscription basis.)

Conclusion

The appraisal of pipelines is a specialized and niche industry. The methods for determining value are different from any other type of appraisal practice due to the uniqueness of the product being appraised. No two pipelines are the same. Our methods are based on the way a pipeline owner looks at a pipeline and the right of way in which it rests.

Ultimately, the appraiser can only offer an opinion based on data available and market conditions. When it is all completed, the value is based on what the seller will take and what the buyer will give for a property.

For additional information on this subject visit the author's website at www.pipelineequities.com, or email a request for a complimentary copy of the Pipeline Recovery Manual to davidhowell@pipelineequities.com.



THE UNDERGROUND WORLD OF PIPELINE APPRAISAL

BY DAVID HOWELL, SR/WA

The appraisal of pipelines has evolved into a highly-specialized profession. The primary reason is that, while standard appraisal methodologies are used to determine the land value, there are a host of unique factors to consider where pipelines are involved.

In working with pipeline appraisal projects for many years, I have found that pipelines are frequently valued incorrectly. Pipelines involved in mergers, acquisitions, and estate settlements are frequently valued incorrectly due to inexperience and lack of knowledge. Local taxing authorities will almost always over-value a pipeline property.

My company, Pipeline Equities, utilizes numerous methods of appraisal that are specifically suited to the pipeline industry. Our methods are based on the way a pipeline owner views a pipeline as well as the right of way in which it rests. The methods for determining value can be quite different from other types of appraisals and extend well beyond the land value to include demand for the property, utility of the property, scarcity or supply of the property and ready transferability of ownership rights.

A typical appraisal might use any number of standardized methodologies, such as highest and best use, across-the-fence or comparable sales to assign value to a particular right of way. However, in appraising pipelines, determining what the surrounding land is worth is only part of the equation. The value of what lays under the right of way will inevitably add another element.

Unique Factors to Consider

While pipelines are best suited for the original intent, there are occasions when pipelines are being valued for a usage change. Pipelines can be converted from crude to fiber optic conduits or conduits for electric power line cables from wind farm electric grid centers. In these cases, valuation considerations will need to include the cost to convert the pipeline into another use. Other factors depend on whether the product transported in the pipeline is purchased at the wellhead and resold. If the pipeline requires specific procedures, such as the cost to compress, enhance, treat, clean or process, this will add another factor into the mix.



Airports that have fuel trucked in can have significant cost savings by building a pipeline to the fuel source.

Situations frequently arise where a valuation report is needed for an active or inactive oil, gas, or product pipeline. The report might be required for a sale or divestiture, readjusting tax assessments, estate settlement, partnership termination, determining salvage value or preparing for a pipeline use conversion. Regardless of the purpose for the appraisal, there is always one objective – establishing an accurate value.

To underscore the need for specialized pipeline appraisal methodology, let's take a look at some recent appraisals.

Pipeline Rehabilitation

My company recently appraised a vintage crude pipeline in a mature field on the west coast. The line had been active in the past and later became idled. The operator was planning to rehabilitate and reactivate the line, and needed a new appraisal to help determine the level of common carrier transport fees and tariffs once the line was put back into service.

At the time, there was a great deal of new activity and production in the area as a result of higher prices. New wells were being drilled, and the area seemed to have a booming economy. Most of the right of way went through major thoroughfares, and 90% of the easements

existed in heavily congested urban areas. Since the right of way was underneath city streets, any potential access needed for rehabilitation or for laying new pipe would require cutting through the asphalt and concrete. We determined that, in order to renovate the old pipeline and get it up to current specifications, there would be many permits required, as well as oversight from municipal and state authorities. Realizing this would be costly, we created an estimate based on new construction costs, as well as depreciation, in order to account for rehabilitation costs. We soon recognized that the appreciation of the right of way in terms of costs in the heavily congested areas more than made up for any deficiency in depreciated new construction costs. In essence, the right of way would have been prohibitively expensive to purchase outright in today's market. This is not to mention the bureaucratic nightmare in securing new permits.

As it turned out, the new estimated throughput—in terms of barrels to be moved—was so much greater as a result of the new production that the appraised value far overshadowed the right of way estimates, new construction cost estimates and salvage combined. Rehabilitation was the only viable alternative, as new construction and obtaining fresh permits for right of way and construction would have been totally cost prohibitive. As a result, the company was able to activate and renovate two other pipelines in the area as well.

Appraisal for Construction Financing

When a lone entrepreneur with a good idea has the good fortune to find a banker who shares their vision, together they can accomplish great things. This case personifies the American success story.

A bank officer contacted me about a customer who had obtained a contract to supply jet fuel via pipeline to a municipal airport. The airport had been receiving their jet fuel from 30 to 40 trucks a day, and the entrepreneur projected that a pipeline would be a more efficient and reliable source of transport. The client had already secured contracts from two refineries and had planned

to purchase the jet fuel in equal quantities from both suppliers. This plan projected a considerable amount of savings for the city's airport.

The job would be ready to start within four to six months, and the bank needed an appraisal to satisfy their loan requirements. They turned over plans for the pipeline, along with other documents regarding financial information and estimated costs for the project. Blueprints for building the pipeline were also provided, along with the right of way contract documents, their contract to buy jet fuel from the two refineries and a contract to sell the fuel to the municipal airport. Since the loan amount would range between one to two million dollars, our appraisal was a critical component to getting loan approval.

Research showed that the airport and surrounding area had a history of sustained growth. On the demand side, the airport traffic was growing, and the adjacent area was showing an expanding base of customers from tourism, as well as government and private industry. The need was there, and money could be saved through a reliable alternative.

Our primary method of appraisal included the cost for new construction and the projected revenue stream. Other factors that were taken into consideration included front office management, contracts, and the source of supply and demand. Additionally, the pipeline company's financial projects demonstrated that they could get their money back in a three-year payout. The loan was quickly approved and the pipeline is now being built. For the sake of economics, the operations plan was outsourced, and the pipeline company is now focused on building the pipeline as expediently and economically as possible in order to pay off the loan on time.

The entrepreneur had found a niche market in an underserved segment where larger pipeline companies had shown little interest. There are many more situations like this where fuel is being trucked in at a cost that is significantly higher than simply building a pipeline to a refinery or a fuel source. The bank is on the lookout for more deals like this one, and we see enormous opportunity for others who are willing to take on this type of project.

"THE APPRAISAL OF PIPELINES HAS EVOLVED INTO A HIGHLY-SPECIALIZED AND NICHE INDUSTRY."

Appraisal for Pipeline Divestiture

In 2009, a pipeline company contacted us about their plans to split from their private equity investor group. A few years earlier, the investor group had backed their company in the purchase of almost 2,000 miles of transmission, trunk and mostly gathering systems. In this case, the original seller had divested itself from what they deemed to be an obsolete pipeline and gathering system, caused by depleting oil and gas fields throughout the country.

When the deal lagged behind the projections established by the pipeline company, the investor group grew impatient and wanted out. They would need to divide the property, so value was needed to form the basis for settlement between the two parties.

None of the forty systems were currently operating, but they seemed to have potential because they were in active areas. In many cases, a good marketer can sometimes raise the pipeline value significantly simply by finding someone who is willing to explore different uses. An entrepreneurial company might envision converting these same junk pipelines to serve as fiber optic cable conduit, CO2 lines for revitalizing an oil field, irrigation lines or other appropriate uses.

Unfortunately, all efforts to find other uses and buyers for the vast majority of systems had failed. We realized that our only option was appraising the pipelines using



When gas or oil fields have neared depletion, the pipelines serving them should be appraised before taxing authorities will lower rates.

the salvage method. If the right specifications were present, we knew that a pipeline salvage or recovery operator could complete the recycling process and return the pipe to the mill as scrap or to the structural market as steel for other uses.

As these were primarily gathering systems, there was no discernible right of way. We proceeded to determine a salvage value for each of the forty systems based on demand the current demand for the various diameters of pipe. We gave each a net value after take-up costs and landowner damages were taken into account. This enabled us to assign an appropriate value, and the parties involved were able to split up the assets accordingly.

Appraisal for Tax Authorities

Every oil and gas producing state has a field where initial production was flush and new gathering lines were laid to transport new production to market. As time goes by, and the field nears depletion, the pipeline throughput in the gathering and transmission and trunk lines can be operating at as little as 10 to 20 percent of the initial production. In these cases, the operators still must pay regular taxes accordingly to earlier throughput or initial values, which were generally not depreciated accordingly.

Appraisal districts can be tenacious and resistant when it comes to giving up potential tax revenues and lowering tax rates. They require hard evidence in the form of substantiated asset valuations or appraisals before considering any kind of change that might result in lowering tax rates.

Many local tax appraisers use a method based on the cost of new construction depreciated over the estimate life of

the pipeline, with no regard for diminished throughput. This can result in an unrealistic value, as it is based on new or replacement cost with no regard to the current value of the pipeline or the other ways it might be used. My company takes a slightly different approach by determining value based on current volumes of throughput, if any exists. If there are no significant or measurable volumes, then we might submit a salvage value.

Appraising for tax authorities is more basic and routine than any other type of pipeline appraisal, as there are just not that many ways to approach the problems. This is primarily because tax districts are accustomed to dealing with real estate, but not with the different types of inventory that may exist on the property.

Conclusion

Given some of the unique factors associated with pipelines, the appraisal of pipelines has evolved into a highly-specialized and niche industry. The methods for determining value are different from any other type of appraisal practice due to the uniqueness of the product being appraised.

The best way to appraise a pipeline is to gain a better understanding of its potential uses in today's marketplace in conjunction with the property on which it resides. With pipelines, value can be assigned through a combination of demand for the property, utility of the property, scarcity or supply of the property and ready transferability of ownership rights.

Ultimately, the appraiser can only offer an opinion based on data available and market conditions. When it is all said and done, a property's value is what the seller will take and what the buyer will give.



David Howell, SR/WA

David Howell, SR/WA is a Managing Partner at Pipeline Equities, a pipeline merger and acquisition firm located in Houston. His fields of expertise range from pipeline appraisals to supply and distribution, production, pipeline, refining and working with well service contractors. He is also the author of the Pipeline Appraisal Handbook.



A new 6-mile pipeline supplies jet fuel to the new fuel tank terminal at a municipal airport in the appraisal described in this article (Fig. 1).

Proper pipeline valuation requires specialized appraisal

David Howell
Pipeline Equities
Houston

The appraisal of pipelines is a niche industry, requiring specialized methods to properly determine valuation. These methods combine both a pipeliner's view of the pipe and the right-of-way in which it rests as well as traditional appraisal or asset valuation methodology.

Most appraisals, even regarding pipelines, are real estate appraisals. Trained easement or real estate appraisers essentially measure the value of a pipeline according to the value of the right-of-way. This value in turn is based on the value of neighboring land. Though important, however, this is a small part of the overall picture when appraising a pipeline.

Appraisals known as asset valuations establish value for a piece of property, inventory, or business and are more easily adjusted to accurately reflect the needs of the petroleum pipeline industry. The need for pipeline-specific appraisals emerged following discov-

ery of the overvaluation of pipelines by local taxing authorities as well as overvaluation and undervaluation of pipelines in mergers, acquisitions, and estate settlements.

Valuation reports concerning active or inactive petroleum pipelines may be

to replace daily trucking. The new line was to go to a new fuel tank terminal built at the airport (Fig. 1). From the storage facility, trucks would transport fuel directly to planes for refueling (Fig. 2).

The customer's bank agent said construction would be ready to start shortly and the bank needed an appraisal to satisfy their requirements for a pipeline construction loan. The appraisal was to be made based on the plans of the yet-to-be-built pipeline. All parties agreed, settled on a fee, and signed a letter of engagement. The letter explained that the appraisal company would be working for the bank, and the bank, rather than the pipeline company client, would be responsible for payment and expenses.

The appraisal company collected plans for the pipeline along with other documents regarding financial information for the project. It also obtained blueprints for building the pipeline, right-of-way contract documents, a contract to buy the product (in this case jet fuel from a refinery), and a contract to sell the product, in this case at a

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needed for pipeline purchases or sales, estate settlements, termination of partnerships and division of assets, determining salvage value, readjusting local jurisdictional taxes, and establishing value for general accounting purposes. The general methods of appraisal for pipelines have some real estate methods in common such as comparative sales analysis, cash flow, and replacement cost, but others unique to the pipeline industry.

Case study

A customer had a contract to supply jet fuel via pipeline to a municipal airport being supplied by tanker. It planned to lay a 6-mile pipeline from a refinery source of jet fuel to an airport

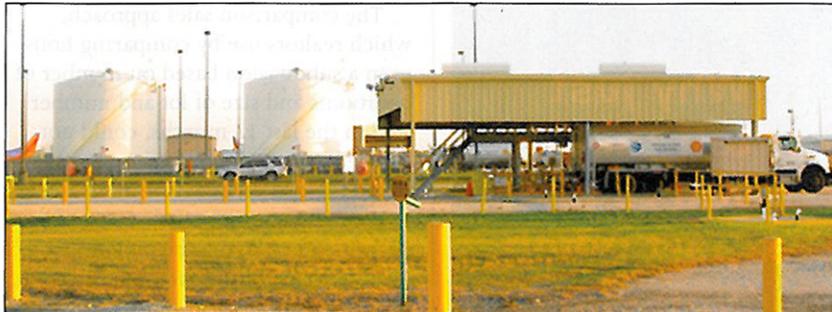
municipal airport.

A meeting with the principal of the pipeline company client who had put the deal together followed review of these documents. Over the course of a meeting lasting a few hours, the appraiser requested any data about the project as well as personal information about the principal. The principal provided a comprehensive resume of his experience in the pipeline industry, later verified through others who had worked with him and knew his management style and abilities.

The meeting then moved to the contracts section. The appraiser was interested in the demand side and how revenue would flow. The purchase contracts showed a 10-year agreement with the airport to supply jet fuel from the pipeline company with an escalation clause and renewal opportunity at the end of term. The bank loan would be repaid in 3 years under the existing cash flow proposal. The airport and its municipal owner would save 32% vs. trucking rates.

A survey trip to the site allowed photographs of the source, the right-of-way, and the terminal area where the city had built fuel storage tanks in anticipation of the pipeline construction at the airport terminal. Aerial photographs of the route and driving the easement in a four-wheeler provided additional perspectives. The contractor had produced alignment sheets showing the exact path of the pipeline. The client had mapped the right-of-way away from heavily congested areas like schools and subdivisions to avoid the sort of controversy that can kill or delay projects indefinitely.

Regular shipments of 30-40 tanker trucks/day were supplying jet fuel to the airport, and the client had seen economics existed to build a profitable pipeline and provide a reliable source of transportation while saving a considerable amount of money for the city's airport. Two refineries side-by-side and only 6 miles away from the market assured the source of supply. The pipeline company had secured contracts to buy



From the on site storage facility the jet fuel is transported by truck directly to the aircraft. Trucks used to transport the fuel between the refinery and the airport as well (Fig. 2).

jet fuel in equal quantities from both suppliers. On the demand side, airport traffic was growing, and the surrounding area had a good base of growing customers from tourism as well as government and private industry. The client had secured a 10-year contract to supply the airport with needed jet fuel.

Demographics looked good as the airport and the area it served had a history of sustained growth. The management team in the front office and the field looked good. The operations plan was unique in the way it was outsourced for the sake of economics and simply because a large company-based staff was not necessary. The pipeline company principal was interested in building the pipeline as economically as possible to pay off the loan quickly.

This pipeline client had found a niche market in an underserved segment larger pipeline companies had not chosen to pursue due to its scale. But this pipeliner could own a pipeline free-and-clear and his bank could get its money back in a 3-year period. Completing the appraisal and delivering several hard copies to the bank and the client preceded quick loan approval. The pipeline is now complete and operational.

Appraisal methods

The primary method of appraisal was the construction cost, new or replacement cost approach. This method is based on the cost (amount spent to construct or improve) of building a new or similar pipeline using the same

materials and the same methods and amounts for payment of easements, damages and construction, etc. This approach can also work back to depreciate new replacement cost on an annual basis projected to the life of the pipeline to determine the value of a vintage pipeline in today's market.

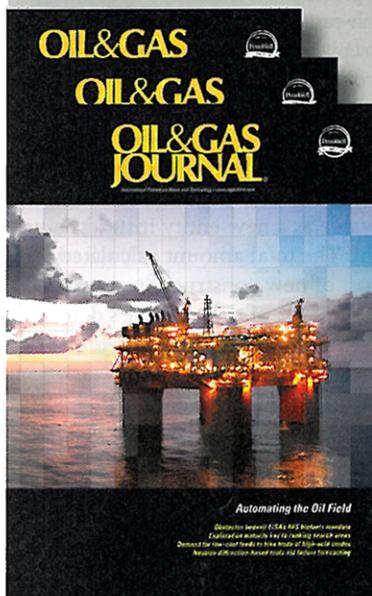
Depreciation or devaluing of this pipeline was not necessary, the current value as a new entity instead being sought. The total amount calculated for the cost of new construction accounted for about 50% of the pipeline's determined value.

The appraiser also applied a variation of the real estate income capitalization approach by which the annual income stream based on gross revenue net of operating expense is multiplied by factors of 5 to 12 depending on potential for revenue increases through tariff or volume additions. This method also works in valuing oil and gas royalties or mineral interests.

Many correlations exist between the value of a pipeline in the ground and mineral interests. Pipelines have an indefinite life and seemingly new applications are being introduced for their use just as technology continues to expand and enhance the value of mineral interests.

If revenue produced is \$100,000/year after operating expense, this appraisal approach would calculate 5 to 12 times this number and weigh it in as 50% of the overall value. The degree of multiplier depends on the value of the factors used and their weight.

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The comparison sales approach, which realtors use by comparing houses in a subdivision based on number of bedrooms and size of lot and number sold in the last 12 months, could not be used. Nor could real estate acreage sales. The real estate factor in easements is generally not more than 5-7% of the overall cost of laying the pipeline.

Book value of the asset by the seller is only important to the seller. It is not a viable approach or method to determine or assign value. Even though a potential purchaser would care less at what value the seller carried the asset on his book, the book value could have a bearing on the seller and his willingness to sell.

Highest and best use is a principle with its roots in real estate and wants to state simply that a parking lot might be best used for a strip shopping center instead. The best use for a pipeline might be a variation of pipeline usage by converting it to electric cable conduit, water or sewage transportation, or reversing flow as an oil, product, or gas transmission line, or increasing its size and utility via replacement. It, however, remains a pipeline.

Value factors

The pipeline appraisal industry uses more than 40 different factors for determining value in a pipeline beyond the basic appraisal approach methods. These subdivisions of appraisal range from pipe WT and the date of its installation to the types of chemicals being transported. Factors used in calculating the value of the jet fuel pipeline included:

- Availability of supply and multiple suppliers. With two refineries side-by-side the pipeline company could take equal amounts from each or increase from one or the other in times of higher demand or in case of unforeseen occurrences, a factor in appraising the pipeline's value. The proximity of supply was also important, the refineries being only 6 miles away.

- Contracts on the purchase side for 10 years and on the sales side for the

same period locked in value.

- Management in the front office and field office showed experience, flexibility, and economy in their approach to problem solving.

- Demand. Steady growth had occurred historically, and demographics showed the promise of continued and steady future growth in the areas of industrial, governmental, and tourist-driven demand.

- The terrain, geography, and weather in the construction area added to the value, the climate being mild and mostly sunny with low rainfall. The pipeline was to be constructed along existing highway and railroad corridors at minimal right-of-way acquisition costs.

- Product volume transported is also an appraisal method (income) bearing consideration.

- Financing methods and terms stood as positive factors in this case.

- The uniqueness of the product transported (jet fuel) discouraged competition.

- High-strength but compact 6.625-in. OD pipe was economical while at the same time accommodating long-term growth in volumes.

The appraisal company spent 2 days on site and 67 hrs interviewing participants, reading contracts, interpreting notes, studying photographs and maps, reviewing demographic information, and writing the report. ♦

The author

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By David Howell

What Is The Value Of Your Pipeline?

Placing a value on a pipeline is a specialized process. The combination of methods used to determine the value of a pipeline or gathering system is unlike any other type of appraisal. Furthermore, no two pipelines are precisely the same. The unique methods described here are based on several years of observing the way a pipeline owner looks at a pipeline and the right-of-way in which it rests.

When placing a value on a proposed or existing pipeline system, several factors are considered by the author beyond the "across-the-fence" (ATF) method. The ATF method - used by many to assign a value to a pipeline right-of-way (ROW) - assumes that the ROW is worth whatever the surrounding land is worth. The ROW is the real estate where the pipeline lays. It is one of the factors in appraisal of the entire system.

The author saw the need to find or devise appraisal methods that are suited specifically to the pipeline industry when he was asked to put a value on pipeline salvage jobs. Among owners, the need for a fair pipeline appraisal methodology arose when it was discovered that pipelines were being overvalued by local taxing authorities and were being overvalued or undervalued during mergers, acquisitions and estate settlements. A valuation report concerning an active or inactive oil, gas, or product pipeline may be needed for one or more of the following reasons:

- Preparing for a sale or divestiture.
- Readjusting state, local, ad-valorem taxes/tax assessments.
- Estate settlement.
- Partnership termination.
- Preparing for a purchase or acquisition.
- Determining salvage value.
- Preparing for pipeline use conversion.
- Establishing value for accurate accounting.

Appraisal Methods

The author's company uses a combination of methods to determine the value of a pipeline. We have found that value is a quantification of the interaction of demand for the property, utility of the property, the scarcity or supply of the property and the ease of transferability of ownership rights to the property.

Market Analysis. The method utilizes sales histories of comparable entities. This works well for valuing land and housing, but each pipeline is so different that a method of comparable sales is not so useful. Because land and housing are plentiful, making commodities of land or houses is much easier than

making commodities of pipelines. However, this method is still useful to get an overview of pipeline value by looking at sales histories of comparable pipelines in varying circumstances and locales. One may make broad comparisons such as urban vs. rural, California vs. Mississippi, gas vs. crude, or regulated vs. non-regulated pipelines.

Highest and Best Use. This is mostly a real estate valuation term; however, on the occasion when a pipeline is being valued for usage change, this method can be useful to establish the value of the existing pipeline and the cost of converting it for another use. Pipelines can be converted from a crude product pipeline to fiber optic conduit or a conduit for electric power lines extending from a wind farm's electric grid center. For the most part, pipelines are best used for the intent constructed. It is best to combine this highest-and-best valuation with some of the 40 pipeline valuation factors such as size of line, geography, terrain or ROW values. For example, the highest and best use for a 6-inch gas line might be to change it out for a 10-inch crude line using the same ROW, if the contract permits such replacement. Ultimately, the highest and best use is that which is most likely to bring the highest net return over time.

Seller Determined Need Or Book Value. This method is used if the seller wants to record financial gain or loss from a sale using book value. It is not much use to a purchaser since it has no relevance to current worth. The book value might be generated by the accounting of the seller/owner of the property, in whatever means the company accounting might use to determine the book value. It might be based on a valuation method such as construction cost-new and discounted, for example, but generally this book value designation by the seller has no relevance to the value of the pipeline as far as the purchaser is concerned.

Income Base Or Cash Flow. This method is a popular means of establishing value for pipelines if they are generating or will generate a predictable cash flow. This method takes into account forecast income based on throughput volumes and transportation rates of the commodity transported. Expenses based on the historical or projected income stream are discounted. Another variation of this method uses multiples of current cash flow where the average annual cash flow is multiplied by a factor of five to 12. This can be done on annual or monthly basis much like values of oil and gas royalties are determined. Many like to correlate pipeline values to oil and gas mineral interests regarding value. Both can have an indefi-

nite life and both can be reborn as new drilling or new discoveries are made in an area served by the line. These additional income streams can be discounted to find a present day value or in some cases when using future multiples of income. For example, the future income after operating expenses of a gas pipeline might be \$200,000 per year. A reasonable value might be five times that amount or \$1,000,000. A buyer might determine that the net present value in dollars paid today might be 20% less than the \$1,000,000 or \$800,000 in today's dollars. Present value is the term used when discounting future income to a present value or the value of a future income to a present rate.

Construction Cost-New. This is the cost of rebuilding the same pipeline in the same size, same manner and in the same (or comparable) easement. This is an important factor in placing value on a pipeline to be considered by a purchaser. This approach also can be discounted. For example, a pipeline that has been operating for 10 years after it was initially installed might have an expected life of 40 years. It could be discounted 2.5% per year of life or a total of 25% off the cost of new construction in today's market. This discussion is based on straight line depreciation which is common and prevalent in the industry.

Value Determination Factors

In addition to the appraisal methods, several factors must be considered when assigning value to a pipeline. The author's firm uses as many as 40 factors to make value determinations regarding pipelines. These factors cover the more technical aspects of business, physical, property and commodity value. Some of these might include:

- **Business Value** — (1) throughput value transportation (income), (2) supply (other pipeline availability in area/scarcity), (3) demand (potential buyers and users), (4) potential for additional uses or more customers for product transported, (5) sales contracts or purchase guarantees (terms and length), and (6) management (front office and field).
- **Physical Pipeline Attributes** — (1) date of installation (vintage), (2) type of installation, (3) appearance of pipe, (4) method of construction, (5) salvage value after termination of usage, (6) type of system (oil, gas product, jet fuel), (7) size of pipe in pipeline (specifications), (8) interconnects (with other pipelines or supply sources), (9) amount of cover on pipeline, (10) pipe protection (coatings), (11) cathodic protection, (12) type of system (trunk,

gathering), and (13) records availability (alignment sheets, maintenance records).

- **Property Value** — (1) right-of-way-agreements (basic contracts), (2) geography/terrain, (3) maintenance records, (4) appearance, (5) surface inventory (including appurtenances), (6) condition of equipment (scrubbers, compressors), and (7) congestion (urban or rural locale).
- **Commodity Value** — (1) market price of commodity transported, (2) product source (well depths, reservoirs), (3) chemical content of product transported (gas liquids, corrosives), (4) proximity to markets, (5) diversity of suppliers, and (6) diversity of markets.

Other factors depend on whether product in the pipe is purchased at the wellhead and resold; whether and to what extent the product is compressed, enhanced, treated, cleaned, or processed; and by what procedures is it compressed, enhanced, treated, cleaned or processed.

Recent Appraisal Projects

The author's firm has had several recent opportunities to appraise pipelines for a variety of purposes.

Pipeline Rehabilitation Appraisal. A vintage crude pipeline in a mature field on the West Coast recently was appraised. The line had been active in the past and later idled. The operator had intentions of rehabilitation

and reactivation of the line and needed a fresh appraisal to help determine transport fees or tariffs as a common carrier. It was necessary to estimate the new construction price as well as depreciation and account for rehabilitation costs. We found the appreciation of the right-of-way costs in the heavily congested area more than made up for any deficiency in depreciated new construction costs.

Construction Financing Appraisal. A bank contacted Pipeline Equities to obtain an appraised value for a pipeline to be built that would transport jet fuel to an airport. The bank wanted to know the value of the proposed pipeline before financing the construction cost. In place were the contract (long term), a firm bid for construction (construction cost new), and competent experienced management.

Pipeline Divestiture Appraisal. A hedge fund decided to exit the pipeline business and sought Pipeline Equities for an appraisal of hundreds of miles of their active and inactive gathering and transmission pipelines. They needed to determine the value of the pipeline network in order to divide interests among investors. Pipeline Equities was able to use multiple methods including salvage to arrive at an equitable value to which all parties agreed. Many of the gathering lines had no discernable easement by which a ROW only method like the across-the-fence method could be used.

Appraisal For Taxing Authorities. The

company has seen many instances where a pipeline or gathering system was built for a new field with flush production and the field now is nearing depletion. Nevertheless, the operators still must pay regular taxes where applicable according to earlier throughput or initial values which were generally not depreciated. Local and state taxing authorities want up-to-date appraisals if they are to lower rates. Many local tax appraisers use only construction cost-new method (the cost of replicating the pipeline today) with no regard for throughput generally via abbreviated Marshal and Swift formulas.

Ultimately, the appraiser can only offer an opinion based on data available and market conditions. When it is all completed, the value is based on what the seller will take and what the buyer will give for a property. For a complimentary copy of the Pipeline Recovery Manual, contact the author. **PEGJ**

Author: David Howell is senior right-of-way agent and managing partner of Pipeline Equities, Houston. He has been in the pipeline salvage and recovery business for 26 years. He is a designated senior right-of-way agent through the International Right-of-Way Association with certificates in Environmental and Acquisition/Negotiation and a graduate of Texas A&M-Kingsville. He is the author of Pipeline Recovery Manual and Pipeline Appraisal Handbook. He can be contacted at: davidhowell@pipelineequities.com, www.pipelineequities.com.

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Methods for determining the value of pipelines, Part 2

Here's how to determine whether excavated and salvaged pipe is an asset or liability.

David Howell, *Pipeline Equities*

The idea of excavating for salvage a pipeline that was laid 75 years ago may seem irrational—or at least very questionable—to those not acquainted with the industry. Most people would consider the undertaking to be solely for scrap value, and thus miss additional worth.

The answer lies in knowing how to assess the pipe and taking the guesswork out of the equation.

The standard formula for determining the overall value of a working pipeline involves net operating income (NOI) multiplied by a lifetime number. For example: \$450,000 times 10 years equals \$4.5 million.

An alternative to this type of valuation is the replacement-cost-new method, using the replacement cost of the pipeline based on today's depreciated cost to reflect the age of the pipeline.

This method takes into account the construction and acquisition costs associ-

ated with replacing the old pipeline with a completely new pipeline. There are circumstances when, due to demand and scarcity, an easement, corridor or right-of-way might be worth more than the 70- or 80-year-old pipeline that lies in it.

Salvage value

Salvage-value determinants vary depending on the market. Almost all steel-related markets are weighted by the price of scrap at one time or another. One barometer for determining the value

Lack of experience and training leads to piles of junk pipe ready for the local scrap yard.



of good used pipe is to give it worth based on 70% of the price of new similar pipe. Normally, this is the highest price charged to an end user for used pipe.

However, there are several layers of wholesale prices between an end user and the salvage operator. Between the two are the hauling, grading, straightening, cleaning, beveling, cutting, loading, trucking and selling of the pipe. Often an entire line might be sold to one distributor, who then resells in truckload quantities to others who might sell by the piece. Each level of sale has a different price for a unique utility, and each level has a specific type of buyer. This is the nature of the structural-steel industry.

At its core, pipeline is just a tubular form of steel and is used in the same manner as any commodity. For a seller, the goal is to get as high up the sales

chain as possible to reap the most for the product. A seller might never deal with end users at the 70%-price level, but instead could try to get the 50%-price level, leaving some 20% of margin for distributors who deliver to end users and manage the credit, collections, warranties and other problems associated with retail customers.

Net value

Most pipelines excavated for structural purposes are measured by weight on a per-ton basis. There are millions of feet of vintage pipeline in the U.S. of 8 5/8-inch diameter, formed via a construction method called "lap weld," which is a butt-weld-type construction.

Lap welding begins with a sheet of steel that is rolled into a tubular shape and welded at the point where the ends

come together, or lap. Almost all pipe laid in the 1920s and 1930s for oil transportation was lap-weld construction with a uniform 0.322-inch wall thickness. This type of pipe weighs 28.55 pounds per foot and is called "standard wall." The joints are usually 20 feet long. Why 20 feet long? Because that was the length that fit on a mule-pulled wagon used to distribute pipe along rights-of-way.

If the price of scrap for "long iron," as scrap dealers term it (pieces of pipe longer than three feet long), is \$200 per ton, for example, then standard-wall pipe is worth 10 cents per pound ($\$0.10 \times 2,000 = \200). The 28.55-pound-per-foot standard-wall pipe is worth \$2.85 per foot, at a minimum, because that is what it would bring as scrap after being hauled to a scrap yard. In any case, the



Price	Used	New (equivalent)
Price per ton	\$200	\$900
Price per pound	\$0.10	\$0.45
Price per foot of 28.55 lb/ft pipe	\$2.85	\$12.85

Table 1. Source: Pipeline Equities

scrap establishes the minimum worth, and the price of new pipe at the mill represents the maximum worth.

The mill price might be \$900 per ton (45 cents per pound). If new and old types of pipe were the exact same product (which they are not), then new pipe is worth \$12.85 per foot ($\0.45×28.55). For estimating purposes, the new-pipe price is \$12.85 per foot, and the scrap price is \$2.85 per foot. (See Table 1 for price comparisons.)

Somewhere in this range is a value for reuse of pipe for structural purpose. Also, estimators must take into account the value added at different stages going up the sales chain.

For example, one wholesale shop might cut the pipe into 10-foot lengths and bevel or finish each end of the pipe. Another shop might weld a 15-foot length to a 20-foot length of pipe to make a 35-foot joint for use in a particular piling job that requires that length.

Also, customizations are as varied as usage. Structural applications for used pipe include corrals, fence posts, flag poles, bridge railings, cattle guards or even reuse as a pipeline or driven as pile for strengthening supports.

One salvage yard in Oklahoma uses 22-inch-diameter pipe by splitting it longitudinally and welding plating on the sides to make feed troughs for cattle feedlots. That company, in particular, will satisfy healthy demand from the agriculture sector for many years.

All of this repurposed pipe is worth what the market will bear, based on price, condition, demand and availability. It is worth a great deal more than scrap. Yet, to a pipeliner, used pipe might be seen only as scrap.

Inside a bell hole, an inspector checks a pipeline for wall thickness, coating, depth and soil conditions.

The following costs for pipe removal are used when factoring net value:

- original purchase price of the pipe
- excavation cost
- transportation
- landowner compensation
- crop damage, and
- administration expense.

(See Table 2 for an overview of additional costs to factor into the net value of used pipe in today's market.)

These costs usually average \$2.60 per foot, which is very close to breakeven at scrap values—if scrap prices were that high. There are many variables, but scrap should only be a backup plan in case all else fails and there is no structural market. (It is important to note that a non-qualified track-hoe operator can make scrap out of the best pipe ever laid. If he is not careful, he can ding, dent, scrape and bow any pipe into junkyard long iron.)

This is a fairly lengthy explanation of how to determine used-pipe value.

Price spreads between new and used pipe can be substantial.

However, estimators might consider a short-cut method to arrive at a rough estimate: (sell price – costs) x line length x 90%. If a seller can sell used pipe for \$400 per ton (\$0.20 per pound, or \$5.71 per foot), then after subtracting the take-up and cleaning costs, the pipe might be worth a net of \$2.25 per foot. The seller can multiply by the length of the line and subtract 10% for losses and damaged pipe to come up with a value of about \$2 per foot for the vintage pipe after removal.

Transportation and condition

Meanwhile, sellers and buyers must take into account the cost of transportation. At press time, trucking costs to bring pipe to Houston to be cleaned, straightened, cut, re-welded or worked in any way for the purpose of exporting through the Port of Houston was about \$1.75 per loaded mile. Rates can vary from \$1.50 to \$2.25 per loaded mile.

In the course of due diligence, it is necessary to survey the pipeline by traveling the length of it to look for unforeseen hazards like lakes, rivers, expensive crops, marshland, wildlife refuge areas, other environmentally sensitive areas and encroachments of all kinds.



Additional cost factor	Approximate cost per foot
Purchase of pipe from owner	\$0.35
Excavation	\$1.90
Transportation	\$0.15
Landowner compensation	\$0.20

Table 2. Source: Pipeline Equities

Often, a home, barn or other structure has been erected over the right-of-way. In such case, a qualified operator must dig a bell hole over one section of the pipe to confirm the pipe is there, the depth it is buried, the size and its condition. During the inspection, a sample of pipe coating can be examined to determine its composition. This part of the investigation is particularly important, as asbestos presence can affect the cost for pipe removal and disposal of the residue of asbestos-containing materials.

Checking the pipe for type and quality of steel is important in determining its integrity. The best way to do this is to cut a section or coupon of the pipe

measured by pressure per square inch. Additional tests can be done in metallurgical laboratories to determine the various chemical elements inherent in the steel.

Conclusion

Many factors determine the value of vintage pipelines. A buyer or seller will not be able to ascertain a pipe's condition without thorough investigation. After all, a lot can happen in 60 or more years, especially underground.

The goal in appraising salvage value is to keep the pipe above scrap value and sell it into the structural market. Most destruction of good structural-grade

Builders should consider additional cost factors when calculating the net worth of pipe.

and send it to a lab for testing for yield or burst as well as tensile or hardness, usually

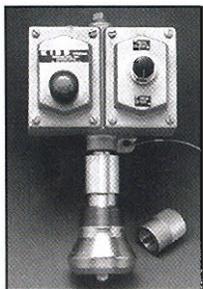
steel pipe results from contractors or equipment operators who do not understand its value and treat it as junk. And junk it becomes in the hands of the uninformed, with value only for what it will bring at the local scrap yard. ■

David Howell is managing partner of Pipeline Equities, which salvages, rehabilitates and appraises pipelines. He is a designated senior right-of-way agent and the author of the Pipeline Recovery Manual and Pipeline Appraisal Handbook. He may be contacted at pipelineequities.com or davidhowell@pipelineequities.com.

For more on pipeline evaluation, see *Methods for determining the value of pipelines, Part 1*, in the September 2010 issue of *PipeLine and Gas Technology*, or online at www.pipelineandgastechology.com.

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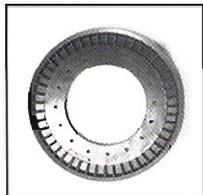
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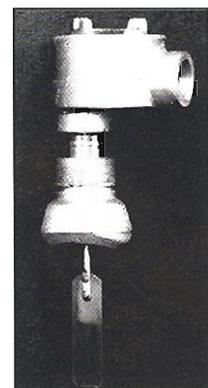
Kidd's Uni-Tec Model 500-S Sphere and Pig Passage Indicator

indicator assembly is housed within stainless steel and pressure balanced without the use of any dynamic seals. It features the use of a hermetically sealed proximity switch, permanent magnetic field and extended trigger arm for bi-directional operation in oversized pipe sections. With stainless steel components and welded assembly, the indicator has minimum moving parts which insure continuous operation without requiring maintenance. Once installed and properly adjusted, it is maintenance free. The indicator is hydrostatically tested at the factory to a minimum of 4,000 psi.



Uni-Tec Model 300-S Electrical Flow Switch

features the use of a hermetically sealed proximity switch, permanent magnetic field and paddles for bi-directional operation. Simplicity in design is the key to Flow Switch reliability. As line flow begins, the paddle moves a cam upward raising the magnetic field into the immediate vicinity of the switch. The switch closes completing the electrical circuit. As flow ceases, the paddle and cam return to their static position, allowing the switch to open. Housed in stainless steel and pressure balanced using dynamic seals, the Flow Switch can be adjusted, serviced or installed under pressure conditions, and each is hydrostatically tested to a minimum of 3,000 psi. Field-testing proved the Kidd Flow Switch exceeded all requirements for service and performance.



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How to Recycle a Pipeline

by David Howell, Senior Right of Way Agent,
International Right of Way Association



In 1920, an 8 5/8" diameter pipeline was laid near Tulsa, Oklahoma for the transportation of crude oil from a new discovery field to a tank farm 40 miles away. The field had flush production or large amounts of crude initially, but was depleted within a few years. In the late 1920's, new fields were being discovered on a regular basis in the Permian Basin of Texas. This same pipeline was recovered from Oklahoma and transported to Texas to transport the new crude oil from the new wells to a tank farm.



A finished product. This 8" steel pipe used as bridge guards
was reclaimed from a recovered pipeline that had been
installed in 1923.

When the pipeline was originally laid in Oklahoma, it was spread out in 20-foot sections kicked off of wagons pulled by teams of mules into a pre-made ditch. These individual joints were screwed together at these 20 foot intervals and tightened with chain tongs to hold "back up" and 48" pipe wrenches with a "cheater" or 3-foot extension of 2-1/2" outside diameter pipe on the end of the wrench. This would allow more than one person to tighten joints. The result was a pipe collar showing on the outside of the pipe indicating a connection every twenty feet of pipeline. When the pipeline was recovered in Oklahoma, the pipe often disconnected during attempts to pick up the pipe from the ditch.



Example of a finished product. This 8" steel pipe used as bridge guards was reclaimed from a recovered pipeline that had been installed in 1923.

Around the late 1920's, a stronger and simpler jointing method was introduced into pipeline industry. Acetylene welds were strong enough to keep the needed pressure on the pipeline for low-pressure crude transportation, though they were not as strong as the wall of the pipe itself. Acetylene welds eliminated the need for two or three men manhandling large pipe wrenches and chain tongs. When the pipeline was sent from Oklahoma to the Permian Basin of Texas to be re installed, the old collars and threads were cut off and beveled in order to facilitate the new acetylene weld jointing technique. The line was then re-laid in 1928 in Crane, Ward, and Winkler Counties in Texas. This pipeline later went through a succession of three owners for various reasons over time and was purchased for salvage purposes in 2007. The fields and wells this pipe was intended to service had been depleted, and the line was no longer viable as a pipeline in that particular location. The salvage or pipeline recovery team proceeded to remove the pipeline and the company's marketing department shortly found an application for the pipeline. It was found that despite a little wear, the pipeline had the qualities of good Grade B steel. The thickness of the wall of the pipe was intact and had very little corrosion. It was found to be suitable for transport of slurry from a copper mine to the disposal site nearby,

but away from the mine. The Mexican company that owns the mine expects to use the slurry line for as long as the mine is in operation.

An additional 30-mile section of this line was recovered and shipped to Vietnam to be used as a water transportation pipeline near what is now Ho Chi Minh City. It will probably be used there for another forty years.

This steel pipeline that was manufactured at least 89 years ago has been through 4 incarnations. Eventually when the copper mine is depleted, this pipe will be recycled once again until one day it will end up as scrap to be molded into plate, sheet, and coils for another round of uses.

The pipe is simply steel in tubular form.

Rewards for Reuse

If these applications are noteworthy then the pipeline industry might think in terms of rehabilitation of this steel for their own use. The pipeline recovery industry resells into the structural market for the most part, but I believe this is under using a valuable asset.

In this era of high commodity costs, it seems imprudent and wasteful to not rehabilitate pipeline through recovery and recycling. The cost of new 8 5/8" diameter steel pipe to go into a pipeline can cost up to \$25 per foot. That same size and grade can be excavated for less than a third of that cost. Why would a company not remove a pipeline that has outlasted its usefulness in one location and move it to another? Probably ignorance of the opportunity and inexperienced personnel is the reason. It doesn't take a Ph.D. engineer to buy off the shelf or according to what the tubular salesman advises.



Basic method for straightening pipe that might have become bowed or bent. Located at Certified Pipe Services (CPS) yard in Houston. CPS has extensive storage and rehab facilities.

This is the most compelling reason for pipeline recycling. Clean up your mess before someone makes you do it. It is far cheaper and easier to take care of responsibilities on your terms rather than on the terms of a state or federal bureaucrat who neither knows nor cares about the ways and woes of the industry.

In 2008, our company took up a 6 5/8" diameter line in Central Louisiana that had been in gas service for nine years. The field depleted and the landowner who was using the land for timber wanted the pipeline removed so as to use the right of way to plant more trees. We took up the line, transported it to the CPS yard in Houston where workers cleaned the paraffin out of the interior of the pipe, straighten where needed and removed the fusion bond epoxy coating off of the exterior. We then beveled the ends and sent the pipe on to a recoating yard and it is now in service as a gas transmission line in Oklahoma. Even with all of these steps, the customer saved thirty per cent off of new pipe prices.

An 8 5/8" diameter pipeline was re laid in during the 1950's in the Panhandle of Texas near Amarillo. The pipe was of A.O. Smith manufacture and used one of the first electric weld type construction before today's ERW type construction. We don't know where the pipe came from originally, but it was in service until five years ago in its second life. The coating is well bonded, and the pipe is in excellent condition. It has been maintained in an ideal manner. A customer has contacted us regarding taking up the pipe in such a way that we do not damage the coating or at least only minimal damage. We estimate fifteen per cent damage to coating, and it is determined that that amount can be economically replaced in the field with patches. We will take up the pipe in sixty foot sections to decrease the number of welds and cut back on the trucking expense. The customer plans to relay the line for low pressure natural gas service in the Permian Basin area of Texas.

Still another Texas gas producer and pipeline company has made it a company policy to purchase idled or abandoned lines from others for the purpose of take up and removal to another location in their own system. On four occasions in the past three years, the company has excavated, 8", 6" and 12" line pipe from dormant systems, rehabilitated the pipe, and re laid the pipe in a more economically advantageous area.

Cost Savings Incentives

A most compelling reason for rehabilitation of a pipeline is to get rid of the costs of keeping it in the ground. Few companies are aware of the real costs associated with maintaining an idled pipeline. There are miles of pipeline that are idle and will never be used again, but are regularly patrolled by personnel kept on the

payroll and dedicated to that specific task. Others companies pay contract agents even greater sums to answer "One Calls" or DOT calls for the purpose of flagging lines for construction or other identification purposes.

If the company still maintains these rights of way via mowing and general signage upkeep, the costs can be extraordinary. In many states there are judicial districts that assign ad valorem taxes, school taxes, county taxes, and state taxes to these properties. In most operations, people are not aware of these costs, as it does not fall into their job description. The many taxes involved go unquestioned and are paid accordingly. In addition, the incidental pipeline relocation expenses due to highway and subdivision expansion seem to be passed off as necessary costs of doing business.

Regulatory Incentives

A long standing practice of pipeline companies has been "in place abandonment". It is simply a way of reducing responsibility for maintenance and care, taxes, and upkeep while still maintaining ownership of idled pipelines. While this is a positive practice for pipeline operators, federal and state lawmakers and regulators are seeking to end the practice and clearly define the requirements for abandoning or idling these out of use pipelines. Idled pipelines pose potential hazards to landowners and land users. New developments in congested areas often face relocation and identification issues. An even bigger issue is the awareness of rights by landowners who own property where lines are located.

In the future, pipeline companies will be required to remove pipelines if they are termed "abandoned" or if they are idled and show "intent to abandon" due to cessation of usage, lack of maintenance, removal of signage, failure to pay or reducing taxes due to lack of use, etc. At the very least, companies will be required to identify dormant pipeline inventory and obtain permission from landowners prior to abandonment procedures of any sort.

It is not known when new regulations will be instituted on the federal level, however, at least one Texas legislator from Houston and another from the Fort Worth (Barnett Shale) area will introduce a bill in the next session of the legislature requiring pipeline operators to notify landowners prior to abandonment and obtain permission from the affected landowners.

Procedures for Removal

Reuse of pipelines relies on good maintenance of the line while in the ground and good care during removal. There is an art to the excavation process or at the very

least; the work should be performed by competent and experienced pipeline recovery personnel.



Special tools are required to excavate and prevent damage to the pipe. This half moon shoe is cut to fit the outside diameter of the pipe.

Taking up a pipeline uses much the same procedures as laying it. A specially equipped track hoe is used with a custom shoe attached instead of forks on the hoe to excavate the pipe. Generally, this "shoe" is fashioned to fit the diameter of the pipe without sharp edges on the inside in order to keep from dinging or damaging the exterior of the pipe. This is probably the key part of the entire process. A good hoe operator with the right shoe can unearth good pipe while a poor or inexperienced pipeline excavator can turn the pipe into total junk.

Occasionally a side boom can be used to lift the pipe out of the ditch, but more often the pipe is cut in 100 to 200 foot sections and dragged out of the ditch by a dozer. Dragging out too long a length will cause the pipe to bow or bend. After the pipe is removed, a dozer is used to backfill the excavation ditch and dress up the right of way. A cutter cuts the pipe at the connections in 20, 30, 40, or 60 foot intervals depending on where the welds exist. The best way is to cut the pipe in 40 to 45 foot sections as most truck trailers can carry these lengths. The cutting can be done by torch or by saw depending on the preferences of the supervisor as well as the fire hazards that might be involved. A front-end loader can be

utilized to load the pipe on trucks for transport. Alternatively, special forks can be mounted on the track hoe to load the trucks instead of having to engage a front-end loader on location. Sometimes the loader is not efficient due to its rubber tires. Tracks work best on the right of way. Most pipelines can be removed with two or three pieces of equipment per crew with proper supervision and competent personnel.

Pipe Rehabilitation

Most pipelines have some sort of coating. If proper procedures are undertaken, the coatings can be removed on location or the removed pipeline can be transported to a cleaning yard. Responsible recovery crews are environmentally certified and educated to handle coating waste in case the coating turns out to be hazardous.



This specially enclosed piece of equipment is at work in Stauffer Pipe Service's yard in Houston to remove asbestos-containing materials according to guidelines.

After the coating is removed, the pipe is checked for bends, bows, dents, and dings. Roundness and straightness is also to be ascertained. Pipe should be separated at this stage to determine the better pipe that might be ready to ship to a customer or that might need additional attention. No matter how competent an operator might be, damages will occur, and externally the pipe can be dented or dinged with the track hoe forks or shoe during the removal process.



Beveling machine is used to end finish a rehabilitated joint of pipe.

Sometimes the pipe could be bowed intentionally when laying and need to be straightened. Customers want round and straight pipe, and it is much more economical to load and transport straight pipe. Beveling of each end where the pipe was cut during removal is necessary if the pipe is to be re used as line pipe. Some pipeline recovery crews may be able to rehabilitate excavated pipelines at the removal site by using portable de-denters, pipe straighteners, beveling machines. It is best to reduce the trucking and handling of the pipe as much as possible and perform pipe rehabilitation on-site. Otherwise, there are pipe service yards in various parts of the country that have the expertise and equipment to handle most jobs. If the pipe coating has not been severely damaged beyond repair, the pipe will go directly to a coating facility or threading facilities depending on the intended use for the excavated pipe.

Landowner Relations and Right of Way Agents

Perhaps the most significant part of the process is the care and handling of the landowner on whose property you are going across while retrieving the pipe. A landowner is in a position to help greatly or deal a lot of misery. By the terms of most right of way contracts, the pipeline owner has the right to remove, repair, ingress, egress, and so forth; however, no landowner wants you on their property in any way for any reason. It is important that a skilled, experienced right of way

agent be on the job. Today's farmers, ranchers, and landowners are sophisticated and smart, and a good negotiator can save a lot of heartache. These are not the same people who sold the right of way fifty years ago for a dollar a rod. They have Blackberries and can Google an answer as fast as your teenager.

The best method when you own the easement is to return the right of way back to the landowner at your expense. This is music to the property owners' ears, and in return, they will probably bring coffee to the job site and open the gates for you while you pass through. Seriously, I have found this to be the best method for dealing with landowners. They would like to have clear unencumbered title to their property and to "clear the title at the courthouse" will generally provide smiles. The gift of a joint or two of pipe along the way for culvert use to a farmer or rancher always promotes good relations. Try to avoid the use of money to get the job done. When the exchange of dollars comes into the picture, then it becomes the basis for everything, and it is only a question of how much you are going to pay. Again, that is why a good right of way agent is important.

Marketing the Product

The uses for tubular forms of steel are many. Hundreds of thousands of tons annually go to the piling markets to shore up anything that needs to be strengthened. For example, anything that needs additional support along shorelines, piers for buildings, and bridge supports all utilize tubular steel derived from rehabilitated pipeline. Millions of tons went to China in the Eighties and Nineties for use in the foundations of their extensive highway network.

There are more than 150 companies that resell secondary and rehabilitated line pipe to the ultimate customer. Each of these entities specializes in their local market or in the area of specialization they have chosen. There is a group of companies that only sell 16", 18", or 20" pipe for casing oil and gas well drilling contractors setting pipe in "mouse holes" or "rat holes". This application alone consumes more than 25,000 feet per month of these sizes in the U. S.

Another 150,000 feet per month of 8 5/8" and 10 3/4" line pipe are used each month in surface casing applications for oil and gas operators. Surface casing protects shallow water sands in initial drilling operations onshore. There are companies that sell product to piling contractors and others that sell pipe for culvert for roads and bridges. Still more is used in farm and ranch operations for corrals and cattle guards at gates. Other users need center posts and columns for fences, barns and other buildings. Flag poles, bridge, and guardrail applications consume thousands of tons annually. Our company recently shipped 4800 linear feet of 80 year old pipe to a zoo to be used as a retaining wall to protect

elephants in their habitat. Hundreds of other uses exist for steel in tubular form. Unless prices get exceedingly high, scrap is the last resort for pipeline recovery applications.

Conclusion

Much more could be written regarding the salvage or recovery of pipelines. The process for recovery, the coping with EPA and OSHA, different weights, grades and diameters of pipe could be covered in much more detail. In addition, there are methods and procedures for rehabilitation of pipe in service yards as well as on site or portable operations and which is best. Pipelines can be recovered by companies on a contract or custom basis or they can be sold "as is where is" to recovery operators.

For additional information on this subject, visit the author's website at www.pipelineequities.com, or email a request for a complimentary copy of the Pipeline Recovery Manual to davidhowell@pipelineequities.com.

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Excavating pipe without damaging it requires purpose-built tools such as this half-moon shoe cut to fit the pipe's OD (Fig. 1).

Pipeline operators underusing potential pipeline rehabilitation

David Howell
Pipeline Equities
Houston



By selling recovered line pipe into the structural market instead of rehabilitating it for its own use, the pipeline industry is underusing a potentially valuable asset.

The cost of new 8.625-in. OD steel pipe runs as high as \$25/ft. The same size and grade can be excavated for less than one-third the cost. This article examines the factors affecting potential recovery and rehabilitation of retired line pipe.

Background

An 8.625-in. OD pipeline was laid in 1920 near Tulsa to transport crude oil from a new field to a tank farm 40 miles away. The field depleted within

a few years, but in the late 1920s, the pipeline was recovered from Oklahoma and transported to the Permian basin in Texas to transport new crude oil to a tank farm.

Originally, pipelayers spread the line out in 20-ft sections kicked off of wagons pulled by teams of mules into a man-made ditch. Five-ft chain tongs and 48-in. pipe wrenches sufficiently tightened joints, individually screwed together at 20-ft intervals, to hold back up. This practice led to a pipe collar visible on the outside of the pipe showing a connection every 20 ft. The pipe often disconnected during attempts to recover it from the ditch in Oklahoma.

Oxyacetylene welds were strong enough by the late 1920s to keep the needed pressure on the pipeline for low-pressure crude transportation, though they were not as strong as the pipe wall. Such weld strength eliminat-

ed the need for two or three men with large pipe wrenches and chain tongs. Removal of the old collars and threads and beveling the surfaces facilitated the new oxyacetylene-weld jointing technique when the pipeline moved in 1928 from Oklahoma to Crane, Ward, and Winkler counties in Texas.

This pipeline went through three owners over time and was purchased for salvage in 2007. The fields and wells the pipe was intended to service had been depleted, and it was no longer viable as a pipeline where it was. A pipeline-recovery team removed

the line and the operating company's marketing department found, despite a little wear, the pipeline retained the qualities of good Grade B steel. WT was intact and had little corrosion, making it suitable for transport of slurry from a copper mine in northern Mexico to the disposal site nearby. The owner plans to use it for as long as the mine is in operation

An additional 30-mile section was shipped to Vietnam as a water transportation pipeline near what is now Ho Chi Minh City. It will probably be in use there for another 40 years.

Reuse rewards

Pipeline Equities in 2008 took up a 6.625-in. OD line in Central Louisiana in gas service for 9 years. The field was depleted and the landowner, using the land for timber, wanted the pipeline removed so he could use the right of way

to plant more trees. PE took up the line and transported it to Certified Pipe Service Inc.'s Houston yard where workers cleaned out paraffin from the interior, straightened the joints where needed, and removed the fusion-bonded epoxy coating from their exteriors.

PE then beveled the ends and sent the pipe to a recoating yard. It is now in service as a gas transmission line in Oklahoma, saving the customers 30% off the cost of new pipe.

An 8.625-in. OD pipeline relaid in the 1950s near Amarillo, Tex., used one of the first electric-weld constructions. In service until 5 years ago, the pipe's coating remained well bonded and the pipe itself in excellent condition. A customer wants the pipe taken up with minimal or no damage to the coating. PE estimates 15% damage to coating, an amount economically replaceable in the field with patches, taking up the pipe in 60-ft sections to decrease the number of welds and limit trucking expenses. The customer plans to relay the line for low-pressure natural gas service in the Permian basin.

Another Texas gas producer and pipeline company has a policy in place to purchase idled or abandoned lines for takeup and removal to its own system. On four occasions in the past 3 years, the company has excavated, 8, 6, and 12-in. OD line pipe from dormant systems, rehabilitated the pipe, and relaid it.

Cost savings

A compelling reason to rehabilitate a pipeline is to get rid of the costs of keeping it in the ground. Miles of permanently idled pipeline are regu-



Proper recycling requires proper removal and careful measurement of the pipe. These men are measuring from weld to weld to ensure correct cuts (Fig. 2).

larly patrolled by employees dedicated to the task. Other companies contract agents at even greater sums to answer

“One Calls” or DOT calls flagging lines for construction or other identification purposes.

If the company maintains rights-of-way via mowing and general signage upkeep, the costs can be extraordinary. Judicial districts in many states assign ad valorem taxes, school taxes, county taxes, and state taxes to these properties. These taxes often go unquestioned and are paid accordingly. Incidental pipeline relocation expenses due to highway and subdivision expansion also seem to be simply passed off as a necessary cost of doing business.

Regulatory incentives

Pipeline operators have long abandoned retired equipment in place, seeking to reduce maintenance and care, taxes, and upkeep while maintaining ownership of idled pipelines. Federal and state lawmakers and regulators, however, wish to end this practice and clearly define requirements for abandoning or idling out-of-use pipelines. Idled pipelines pose potential hazards to landowners and land users. New real estate developments in congested areas



This machine at Certified Pipe Services' yard in Houston straightens recovered bowed or bent pipe (Fig. 3).



A beveling machine finishes the cut ends of a rehabilitated joint of pipe, required if the pipe is to be reused as pipeline (Fig. 4).

A cutter cuts the pipe at connections in 20, 30, 40, or 60 ft intervals, depending on where the welds lie (Fig. 2). Most truck trailers can carry 40-45 ft pipe sections. Either torch or saw can cut the pipe, depending on preferences of the supervisor and potential fire hazards.

A front-end loader can load the pipe on trucks for transport. A track hoe with special forks can also perform this task. Tracks work better on the right-of-way than tires. Two or three pieces of equipment

per crew, proper supervision, and competent personnel can remove most pipelines.

often face pipeline relocation and identification issues, and landowners might be unaware of rights-of-way.

Pipeline companies will be required to remove pipelines if they are termed abandoned or if they are idled with demonstrated "intent to abandon" by lack of maintenance, removal of signage, failure to pay taxes due, etc. Regulators will require companies at least to identify dormant pipeline inventory and obtain permission from landowners before abandonment procedures of any sort.

Federal regulation remains pending, but at least one Texas legislator from Houston and another from the Fort Worth (Barnett shale) area will introduce a bill in an upcoming session of the state legislature requiring pipeline operators to notify landowners before abandonment and obtain permission from affected landowners.

Removal procedures

Reusing pipelines relies on good maintenance of the line while in the ground and care during removal. Excavation should be performed by competent and experienced pipeline-recovery personnel.

Taking up a pipeline uses many of the same procedures as laying it. A specially equipped track hoe with a custom half-moon shoe attached excavates the pipe (Fig. 1). The shoe generally fits the diameter of the pipe without sharp edges that could damage the exterior of the pipe. A good hoe operator with the right shoe can unearth good pipe, while a poor or inexperienced pipeline excavator can turn the pipe into junk.

A side boom can occasionally lift the pipe out of the ditch, but more often the pipe is cut in 100 to 200 ft sections and dragged out of the ditch by a bulldozer. Dragging out too long a length will cause the pipe to bow or bend. After removal, a bulldozer backfills the excavation ditch and dresses the right-of-way.

Pipe rehabilitation

Most pipelines have some sort of coating. Removing it can occur either on site or at a cleaning yard. Responsible recovery crews have environmental certification and are educated to handle potentially hazardous coating waste. Checking the pipe for bends, bows, dents, and dings follows coating removal, as does confirmation of roundness and straightness.

Pipe separation separates the better pipe for shipment to customers or reuse from pipe that might need additional attention. Damages will occur no matter how competent an operator. The track hoe forks or shoe cant dent or ding the pipe during the removal process.

Intentionally bowed pipe needs to be straightened (Fig. 3). Customers want round, straight pipe, that is also more economical to load and transport. Reusing the pipe as line pipe requires

beveling each end where the pipe was cut during removal (Fig. 4). Recovery crews may be able to rehabilitate excavated pipelines at the removal site with portable dedenters, pipe straighteners, and beveling machines.

Performing pipe rehabilitation on site reduces the expense of pipe handling to a minimum. If necessary, however, pipe service yards in various parts of the country have the expertise and equipment to handle most jobs. If pipe coating has not been damaged beyond repair, pipe can go directly to a coating facility or threading facility, depending on its intended use.

Landowner relations

Care and handling of the landowner whose property will be crossed while retrieving the pipe is even more important than care and handling of the pipe itself. A landowner can either help greatly or impede recovery. Most right-of-way contracts grant the pipeline owner rights of removal, repair, ingress, egress, and so forth. But no landowner actually wants you on his or her property, raising the importance of having a skilled, experienced right-of-way agent on the job.

The best method when the operator owns the easement is to return the right-of-way to the landowner at the operator's expense. The landowner would like to have clear unencumbered title to his property; granting him that will help move the process along. Once the exchange of dollars comes into the picture, it becomes the basis for every-



This 8-in. OD steel pipe used as bridge guards was reclaimed from a recovered pipeline installed in 1923 (Fig. 5).

thing, and it is only a question of how much the operator is going to pay.

Marketing

Tubular steel has many uses. Hundreds of thousands of tons/year enter the piling markets to shore up anything needing to be strengthened. Anything needing additional support along shorelines, piers for buildings, and bridge supports all use tubular steel derived from rehabilitated pipeline. Millions of tons went to China in the 1980-90s for use in the foundations of its extensive highway network.

More than 150 companies resell secondary and rehabilitated line pipe, each specializing in a particular area. One group of companies sells 25,000 ft/month of 16, 18, or 20-in. OD pipe as casing to oil and gas drilling contractors. Another 150,000 ft/month of 8.625 and 10.75-in. OD line enters the surface casing market for oil and gas operators.

Companies sell product to piling contractors and for use as culvert for

roads and bridges. Still more retired pipe enters farm and ranch operations for use in corrals and cattle guards at gates.

Other users need center posts and columns for fences, barns, and other buildings. Flag poles, bridge, and guardrail applications consume thousands of tons/year (Fig. 5). But unless scrap prices rise dramatically, this market should be the last resort for pipeline-recovery applications. ♦

The author

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Markets and Reuses for Recovered Line Pipe

by David Howell
Pipeline Equities, Houston



Eighty year old line pipe is used in this bridge guard

When we think of pipe that has been buried in the ground for 10, 20, 70 or 80 years, we think of corrosion, rust, and deterioration. That might be true in some cases, but if a pipeline has been laid properly, it can be in as good a condition as when it was rolled off of the steel mill rack and can be re-purposed for additional service in various ways. The key is in the initial installation, care, maintenance, and in some cases, the product that has moved through the line at one time or another.

Uses for Secondary Pipe

Structural usage of pipe means to incorporate pipe in the process of building or for an integral purpose in construction. Almost anything that might need shoring up or strengthening can use steel pipe to lend support. These might be building foundations, bridge and highway supports, or highway construction. The Chinese purchased and used hundreds of thousands of tons of tubular steel in the form of secondary (used) pipe during the initial building stages of their highway system. In some cases, secondary (used) pipe cannot work, as very controlled engineering must prevail. For example, the launch pad at Kennedy Center or a new suspension bridge would require newly manufactured pipe.

One of the most common uses for secondary structural steel pipe is in the piling industry. In this case, steel piles or pipes are driven into the ground, river bottom, or ocean floor to create stability. This stability is necessary to bulkhead a shore line, form a foundation, or create a dock. Through the use of the large piling hammers, the pipe is driven or hammered to give strength or prevent erosion.

Other uses for secondary pipe are as follows:

- Drainage for ponds. Various diameters of pipe can be inserted at desired heights of a pond or lake bank to maintain certain water levels.
- Sinkholes or lower levels where subsidence exists. Pipe is used to drain off excess water accumulations.
- Bar-B-Que or outdoor grills. At least 2,000,000' used annually to manufacture these stationary and mobile cooking units. Mostly heavier wall 16', 20", 24" and 36' outside diameter secondary line pipe.
- Culvert for roads and drainage. Millions of feet of 8" through 20" outside diameter used line pipe are sold in 10' to 16' sections for use as culvert or pass through for drainage under streets, driveways, and roads.
- Bridge work and substructures
- Hand and guard railing for bridges and crossing. One small two-lane bridge in a subdivision might use four hundred feet of 4" through 8" secondary steel pipe.
- Cattle troughs. At least 30,000 to 40,000' of 22" to 48" outside diameter line pipe is cut in half each year and used as cattle feed troughs. Cattlemen say the wider the better as the cows eat a mouthful and raise their heads and the feed comes out. It spills out on the ground with the use of narrower troughs.
- Fences and corrals. Untold millions of feet of 2", 3" 4" and 6" pipe are used by farmers and ranchers throughout the United States. The pipe might be used for fence posts with wire between or the between might be more pipe connecting the posts to make the fence secure. In the case of corrals and feedlots, 50,000 to 100,000 feet can be used easily in a small operation. Eight inch pipe is popular for "corner posts on fence lines.
- Signposts and flagpoles. Look at the supports for billboards along the highways. Look at the cylinder shaped base for floodlights along the city streets. Huge amount of large diameter pipe is used for this purpose in the sign industry.
- Play sets, swing sets. Much pipe goes into the permanent variety of swing and play sets on America's playgrounds.

- Pole barns and sheds. Many dairy, horse farms or regular farms use steel poles as frames for their barns, sheds, and other livestock and feed shelters.
- Mouse holes and rat holes. Most every shallow onshore well that is drilled anywhere uses a mouse hole or rat hole. It is a 40-50 foot deep offset well beside the regular vertical drill hole. It is lined with large enough steel casing to allow the “Kelley” or apparatus that turns the drill stem in the hole a place to sit while connecting to another joint of pipe to be lowered into the hole. Approximately 600,000’ of 16” to 20” outside diameter pipe is used for this application annually on oil and gas drilling rigs.
- Casing for shallow wells. Onshore wells are required to set 200’ to 1500’ of surface casing for shallow wells to protect water sands. As much as 2,000,000’ per year of this pipe (8 5/8” and 10 3/4”) is used annually.
- Dredging. Large amounts of 20” and 24” line pipe are used for dredging channels and canals.
- Road bore. Contractors use large diameter line pipe for casing to lay under highways, creeks and rivers to run electrical and other pipeline through.

Almost anything that uses circular steel or steel in a tubular shape is game for used pipe. Heavy wall 8” pipe can be used to build elephant fences, and large diameter line pipe can be used to make pontoons for boats. Additionally, oil lines can be converted to electrical and fiber optic conduits.

Sources of Secondary Pipe

Structural steel pipe is simply steel in a tubular form. The outside diameter can vary from 1/4” to 72” and beyond. The wall of the pipe can be of virtually any thickness. The pipe is made either by rolling flat plate and then welding the seam or hollowing out a round piece of steel to make a seamless pipe.

There are several sources of structural secondary pipe:

- 1) Leftovers and rejects from mill runs. Most line pipe orders are made directly to a steel mill. There invariably are leftover or overages from that “run” that might have certain defects. These overages are sold into the “reject” market to distributors.
- 2) Replaced pipe from pipeline jobs. Pipeline companies give the “take up” pipe from a new lay job to the pipeline contractor to sell. For example, when a new 36” line is being laid to replace an under capacity 24” line, the 24” line would

be removed and rehabilitated for sale. Replaced pipe is also available from lines that are repaired or updated due to wear or obsolescence. For many years, replaced pipe and mill rejects were the main source of secondary line pipe.

- 3) Recovered pipe from depleted oil and gas wells. When oil and gas wells become non-commercial and reach depletion status and are no longer economically feasible, they are plugged and abandoned (P&A). The pipe that had been used to produce the oil and gas is extracted and available for reuse in the structural market or can be tested and rehabilitated and reused in other oil and gas wells.
- 4) Pipeline Equities. Starting in the mid 1980's, Pipeline Equities began soliciting pipeline companies directly to purchase their "out of use, uneconomic, idled, and abandoned pipelines" for reclaiming, recovery, and reuse in the structural market. This began a mini industry now made up of less than twenty companies that directly solicit these companies for this purpose.

Experience with Secondary Pipe

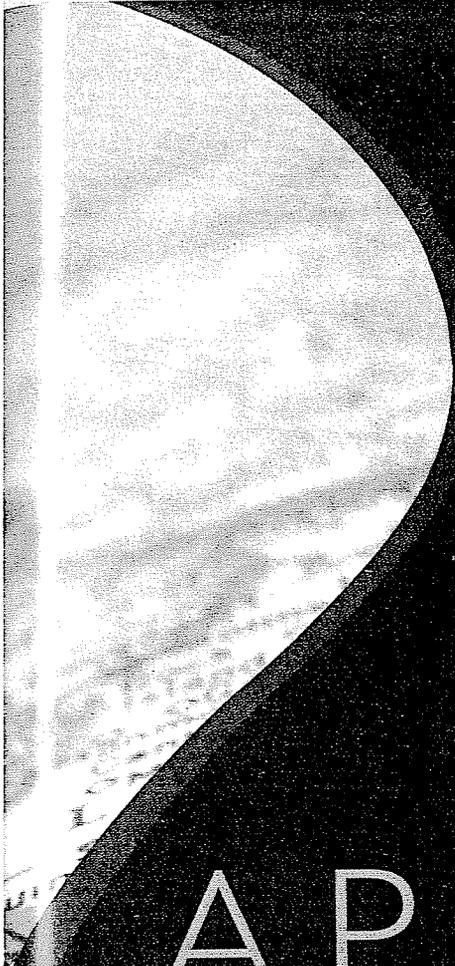
In the early 1920's, an 8" line was laid near Cushing, Oklahoma to transport oil from a gushing, flush producing oil well to a tank farm near Drumwright, Oklahoma. The wells in that field produced for several years and was taken up and moved to the great oil fields near Crane and McCamey, Texas in the Texas Permian Basin. The line was active there for many years and was shut in 2005. Pipeline Equities bought the line and removed it in 2008. Part of this line went to Vietnam to be used as a water line serving parts of a suburb of Danang. Another 100,000' went to Mexico to be used as a line to move slurry from a copper mine.

The very best use for pipelines that have outlived their usefulness in the present locale is to rehabilitate the pipe and move it to another place. The cases of Mexico and Vietnam are a little out of the norm. The reality is this pipe and steel is in good shape and have more lives to live. Pipeline Equities has taken up many hundreds of thousands of feet of pipe and then machine cleaned the exterior, beveled the ends, straightened (when needed), and recoated the exterior. All that is left to do is deliver the pipe to the next job site. We have worked with 6", 8", 10" or any size suitable for gathering, trunk, or transmission pipeline work.

Most of the pipe mentioned above will eventually find its way back to a scrap yard, the last resort for tubular steel. When pipes reach the scrap yard, it is sorted, prepared, and shipped back to the furnaces to be checked for chemical content, reconstituted to the proper yield and strength via additions of proper additives to once again go back to use as plate or tubular steel.

For more information on this subject as well as references and company history,
visit our website at www.pipelineequities.com

3. Articles



THE COST APPROACH IN CORRIDOR VALUATION

BY ARTHUR G. RAHN, SR/WA

The cost approach relates to properties improved with structures and is a process in which the appraiser derives a value indication by:

- Estimating the current cost of reproducing or replacing the existing improvements,
- Deducting accrued depreciation which is defined as the difference between the replacement or reproduction cost new of an item and its value in its current used condition, and
- Adding the value of the land developed from the sales comparison approach wherein the site is considered vacant and available for its highest and best use which presumably is consistent with existing usage.

In the classic sense, in the appraisal of special use properties, it is the improvements which normally define the special purpose or use of the site such as a school, courthouse, hospital or a church.

In transportation corridors, it is the land not the improvements which are unique and constitute the special use. Long, narrow strips of land which provide continuity between desired end points are not ordinarily available in the usual subdivision of land uses. Therefore, the normal process of creating a transportation corridor is through assemblage and the cost approach includes both the acquisitions of the necessary properties to create the corridor together with the normal project costs to make it useable.

Those costs which can reasonably be anticipated in creating a corridor includes and, existing improvements, severance damages, relocation assistance, right of way clearance, legal and litigation fees, project and overhead costs including that giant project killer, environmental impact and mitigation. An analysis of these costs will assist the prospective right of way buyer in determining whether to locate on an existing corridor or to create a new one.

Similarly, there is in the law a "substitute facilities" doctrine which, like the cost approach, is based on the concept of replacement cost less accrued depreciation. This doctrine is used by the courts in condemnation of unique special purpose properties where, because of the special social utility of the property being condemned, just compensation calls for the replacement of the property rather than the mere payment of the value of the property as damages. In such a case, the market value of the property is irrelevant since the constitutional mandate requires nothing less than the replacement of the property.

For example, in 1974, the federal government condemned lands used by a church as nonprofit recreational camps and the 2nd US District Court held that the church should be paid either market value or, if that method was not available, the depreciated replacement cost of the properties. The church said there was no market for the property and the cost of substitute facilities was far in excess of the compensation offered by the government. The 9th US Circuit Appellate Court agreed with the church saying the only way they could be restored to their previous ownership position would be by obtaining a substitute property with a similar utility.

Our purpose here is to show that the distinction between the cost approach and the substitute facilities technique is shadowy and ill-defined. Since both concepts are applications of the basic principle of substitution, the concepts tend to overlap. One logical way to value a special purpose property like a transportation corridor is to determine its present cost of replacement and apply that to the part taken less any applicable depreciation or obsolescence. In many instances this method has been rationalized by

courts as a cost approach to value while other courts have simply asserted that just compensation may be had by requiring either the condemnor to provide a substitute or pay its cost.

There are two California condemnation cases where the cost approach/substitute facilities' technique has been used to value a transportation corridor. The first is, of course, the oft-quoted and much-referenced Sacramento case between the California Department of Transportation (Caltrans) and Southern Pacific Transportation Company (SPTC).¹

The state of California condemned a long, narrow strip of land which was part of a railroad-owned transportation corridor in

In transportation corridors, it is the land not the improvements which are unique and constitute the special use.

order to build a new highway. The condemned strip was about 6,340 feet in length and varied in width from 12.75 feet to 27.75 feet, having a total area of some 127,000 square feet or 2.915 acres. Caltrans also condemned easements to relocate certain underground sewer and water lines into several longitudinal strips bordering and just north of the fee simple take. There were four such parcels that total some 55,545 square feet. Lastly, Caltrans took two transverse easements area to widen street crossings that total 2,788 square feet.

The Caltrans appraisal argued that the portions of the take zoned C-4 were too small and too irregular to be used independently so their sole market value would be derived from their sale to adjacent landowners at a unit price of 75 cents per square foot, 50 percent of the

Caltrans estimated land value for unimproved C-4 land in the neighborhood. Those portions of the take zoned R-1 were deemed to have no market value whatsoever and, therefore, just compensation was nominal – \$1 per parcel for the property involved.

SPTC argued that the highest and best use of the property being taken is as part of its transportation corridor system. They pointed out that such corridors are not typically bought and sold on the open market and, therefore, the commonly employed sales comparison method of valuation was not available. Next, because the corridor is only a portion of a larger transportation system involving people, tracks, yards, operating equipment and other facilities, the income approach could not very easily be used. This left only the cost approach as a means to estimate value of the take.

After hearing all the arguments, the trial judge found that the cost approach was an appropriate method to establish the value of the take and the 3rd Appellate Court of Appeals upheld the lower court's decision.

The second case is not nearly as well known since it has received virtually no publicity and, since there was no appeal of the valuation, it was not published.²

In the 1950s, Southern California Edison (SCE) acquired real property for an electrical transmission line corridor approximately 250 feet wide running from a substation in Irwindale, Calif. to a substation in Montebello, Calif., a distance of approximately 10 miles. In the mid-1960s, SCE was planning on upgrading the corridor to accommodate 500kV transmission lines. The lines have to be separated physically to a specified distance; they have to be parallel and they have to travel in a straight line.

In the late 1960s, Caltrans began construction of the 605 Freeway between the Interstate 10 and the Interstate 210 freeways on an existing street, Rivergrade Road, which ran along the side of the SCE transmission line corridor and on a portion of the SCE corridor.

In June 1969, Caltrans began construction of the freeway on SCE's property pursuant to a Permission to Enter Agreement. The agreement provided, among other things, that

Caltrans would pay SCE 1969 value for the property taken plus 7 percent interest until settlement. If the parties could not agree on value, Caltrans would also file a direct condemnation suit "without unreasonable delay." Since some of SCE's towers required relocation, Caltrans promised title to property on which the towers were relocated and also promised to acquire whatever rights were necessary to restore SCE's transmission line corridor.

The freeway was completed in 1971 but neither the compensation nor the title matters had been settled and negotiations between SCE and Caltrans continued on through the early 1990s. In 1994, SCE retained outside counsel and offered to settle the case for what proved to be a fraction of the eventual jury award. Caltrans countered with another offer which was rejected by SCE. On October 13, 1994, SCE filed an inverse condemnation suit against the state. In September 1995, Caltrans filed a condemnation action against SCE and deposited \$243,485 as probable just compensation for the takings of SCE property.

SCE hired an independent appraisal firm who used a "cost of reproduction" of a substitute corridor approach to best illustrate how the freeway takings had damaged the corridor. SCE could no longer use the corridor for the purpose for which it was assembled. The sales comparison approach was not applicable as there were no comparable sales of operating electrical transmission corridors. The income approach was not applicable as the property (land) did not generate any revenue.

Since the corridor was not useable for its intended purpose, a substitute corridor had to be considered. The appraisal reported that most reliable, least expensive and unobtrusive course for the replacement corridor was selected by engineers experienced in such analysis. The direct and indirect costs of acquiring the necessary property for the reproduced corridor were used to establish the value. The appraiser utilized both the Seymour/Dolman and the Clifford Zoll articles to justify this valuation methodology. His final value conclusion was \$54.9 million including payment for part taken, damages to the remaining corridor and \$6 million to reconfigure SCE's facilities back onto the remaining SCE property. The after value of the part taken was \$13.5 million.

The state's appraiser used the across the fence (ATF) approach and had a value conclusion of \$4.5 million. The state's technical experts advised the appraiser that the property could still be used for electrical transmission lines so no damages were assigned.

On March 11, 1997 after six weeks of trial, a jury in Los Angeles Superior Court awarded SCE a total of \$49.5 million in just compensation for the Caltrans takings. The award consisted of two elements, payment for the property taken (\$13.5 million) and severance damages (\$36 million).

It is probably safe to say the majority of corridor transactions are resolved through the use of ATF methodology since it is the quickest and easiest to resolve and the values produced usually in middle of the value range. However, it is also safe to say that the cost approach/substitute facilities is alive and well.

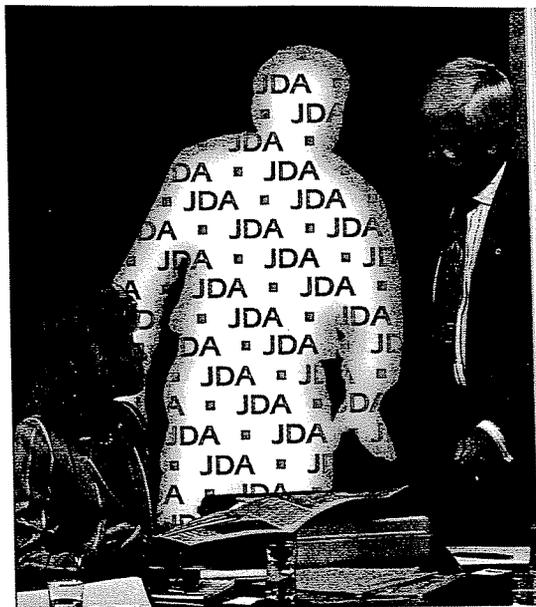
If you are planning a project that envisions taking a portion of a corridor, be aware of the damages your project may inflict on potential uses of the corridor and the cost you have to pay to correct those damages. ♦

Arthur G. Rahn, SR/WA is an appraisal consultant in Fairfield, Calif. He was formerly Assistant Director of Appraisal Services for Southern Pacific Railroad and Manager of Appraisals for the Union Pacific Railroad. Rahn holds a bachelor's degree in accounting from California State University, Sacramento and an MBA in real estate from Golden Gate University in San Francisco. A member of San Francisco Chapter 2, Rahn spoke at three IRWA annual conferences on corridor valuation.

REFERENCES

¹ People ex rel. Dept. of Transportation V. Southern Pac. Transportation Co. (1978) 84 Cal. App.3d 315,327.

² People ex rel. Dept. of Transportation V. Southern Cal. Edison Co. (2000) 22Cal.4th 791



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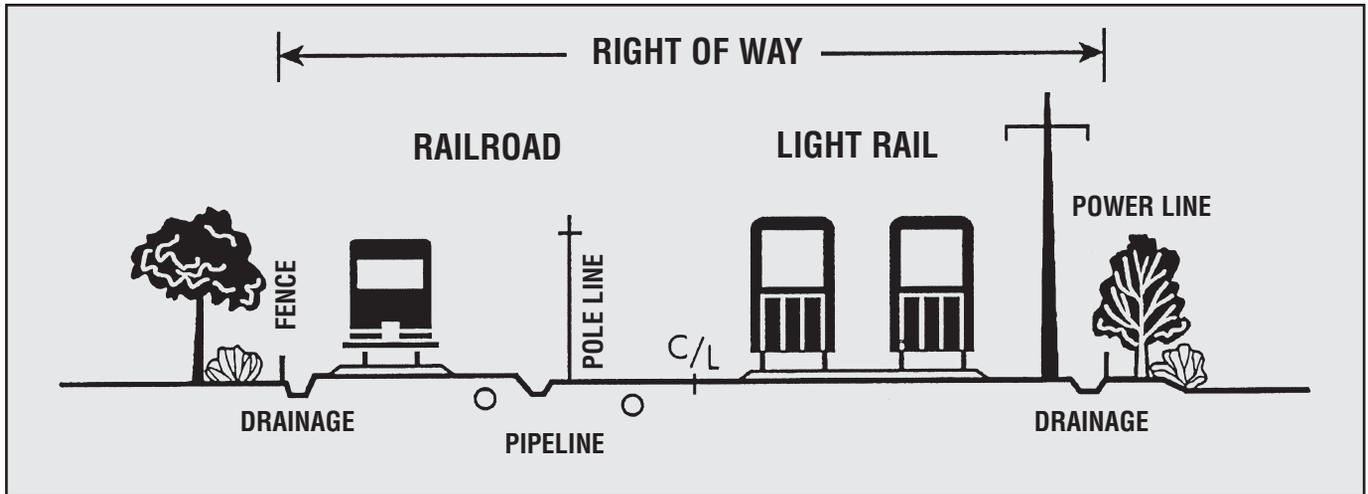
This article was adapted from remarks presented at IRWA's 45th Annual International Education Seminar held in Albuquerque, N.M. in June of 1999.

Valuing a Corridor Within a Corridor



By Richard J. Zulaica, SRWA

The creation of a transportation corridor is a unique process. Assembled by piecemeal acquisition, a corridor is customized and improved, then actively marketed to accommodate potential users. A transportation corridor is a custom made and special purpose property. More than anything else, it is the special purpose that can often complicate the appraisal process of an existing transportation corridor and the value of a corridor within a corridor.



This article briefly reviews valuation methodologies used in appraising a corridor and proposes a new approach to the valuation of a corridor within a corridor. The example used is the installation of a 16-inch water line in a 12-foot wide easement that is within a 100-foot wide railroad transportation corridor (see illustration above).

What is Value?

The value of a corridor within a corridor consists of several elements. Under the California Code of Civil Procedures, fair market value is defined as, “the value of property taken for which there is no relevant market is its value on the date of valuation as determined by a method that is just and equitable.” (There is similar language in other states).

When appraisers, agents and negotiators inquire about the price of a specific corridor within a corridor, they are usually quoted a percentage of fee value. These percentages range anywhere from 10 to 100 percent of the fee value. Use of the proposed new approach to valuing a corridor within a corridor will better quantify the percentage of fee value.

Corridor Valuation

Three traditional approaches have been used to value property. They are the Income Approach, Cost Approach and Sales Comparison Approach. However, these do not readily adapt to the valuation of an existing corridor.

Generally, corridor appraisers do not apply the Income Approach on a transportation corridor. This approach is based on the assumption that the present value of the property is related to the income it can produce. If a corridor is not generating any income, then theoretically, it has no value.

The Cost Approach, however, can be applied based on the cost of the corridor as a finished product (see Ladder of Value diagram, page 8). Valuation of transportation corridors using the cost approach was made case law in the decision of the *State of California Department of Transportation v. Southern Pacific Transportation Company* (84Cal. App.3D315: 148Cal.rptr.535) in Sacramento, California. The jury ruled in favor of Southern Pacific, but awarded an amount close to the original negotiated value.

This award was much less than the value indicated by the Replacement Cost Approach. The Replacement Cost Approach

is the top rung of the Ladder of Value and indicates the highest value. This approach usually amounts to as much as five or six times the Across the Fence (ATF) value. In the opinion of many corridor appraisers, corridors have not successfully sold on the basis of this method. Therefore, it is not an appropriate method to value a corridor.

A more just and equitable method than the cost approach is ATF plus an enhancement factor. ATF, which is the third method on the ladder, is a methodology used effectively to value a transportation corridor. This methodology assumes that the corridor has value consistent with the value of typical adjacent land, as if vacant. It is based upon sales of nearby or adjacent land, without adjustments for size, shape, topography or access. For these reasons, many corridor appraisers believe that ATF is the correct methodology to value a transportation corridor. It is also a methodology endorsed by the Appraisal Institute.

If applicable, an enhancement factor should be applied to ATF. In essence, a corridor is as valuable as (89Cal.App.344). To value the corridor using ATF methodology, the corridor is first split into various parcels in order to create zones of value consistent with adjacent land use.

In the example, the corridor passes through an industrial area where there are several vacant land sales indicating \$5 per square foot. The adjacent segment of the corridor should have similar value. The corridor then passes through farmland with

ACROSS THE FENCE (ATF) is a methodology used to value a transportation corridor. This methodology assumes that the corridor has a value consistent with the value of typical adjacent land, as if vacant and based upon sales of nearby or adjacent land, without adjustments for size, shape, topography or access.



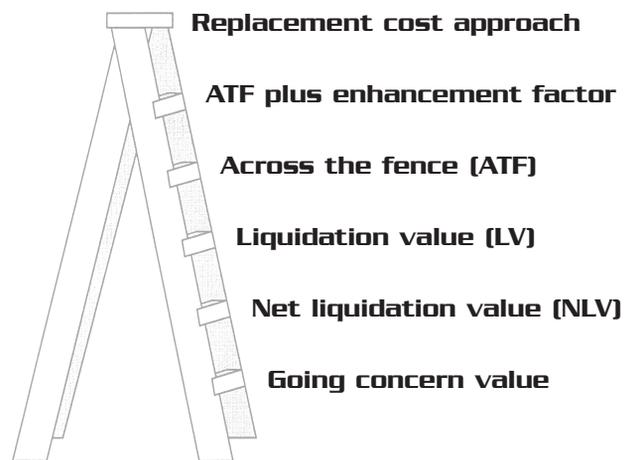
a land value of \$5,000 per acre and the adjacent corridor has similar value. This would continue for all the value segments created. However, the corridor should not be split down the middle since that was not how it was originally created. It was created, as we create corridors today, to impact as few parcels as possible. In addition, negative deductions should not be made for corridor improvements such as cuts and fills, which can change the elevation of the corridor from adjacent development.

Conversely, the Sales Comparison Approach to value transportation corridors is rarely, if ever, used by experienced appraisers. The weaknesses in this approach are the adjustments that must be made to a corridor. These adjustments (location, time, physical encumbrances, existing corridor encumbrances, corridor widths, density of development comparison attempts to use an overall weighted acre or square foot unit of value) become arbitrary and not supportable in the marketplace.

However, when there are sales of other transportation corridors, one can abstract an enhancement factor from the sale. The sales price over and above the estimate of ATF indicates the enhancement factor. Corridor appraisers have analyzed sales across the country to see what these factors may be. Applied to different areas of a corridor, these factors could be whether the corridor passes through the middle of unimproved land, a small community or a heavily developed area. Enhancement factors can range from a low of 1.1 to a high of about 2.5 times ATF as indicated from other sales corridors.

A relatively inexpensive but limited method on the Ladder is Liquidation Value. This views the transportation corridor on the basis that it has lost its economic life. The corridor returns to its original state- a piecemeal acquisition that will be broken

LADDER OF VALUE



into parcels and sold individually. However, attempting to resell these parcels can often be very difficult, since some of them may not have frontage. Owners on both sides of the right-of-way parcels may not want the property due to an increase in taxes or perhaps they have already “got their fences up.” As a result, this approach should not be used to value a transportation corridor. It can be used when a corridor is no longer a corridor and will be disassembled.

An even more limited method of corridor valuation is Net Liquidation Value, which takes the already low (liquidation) value and discounts it for holding costs. When a corridor ceases to be a corridor, it can no longer be marketed as one. Take for example a 12-mile corridor serving a lumber mill. The lumber mill was operating since 1938, but in 1990, the mill went out of business leaving behind a corridor that nobody needs. At this point, the corridor can be valued using the liquidation or net liquidation approach.

Lowest on the Ladder is Going Concern Value. This is considered a weak, speculative approach to value a corridor within a corridor. When this method is used, it is normally applied to only a portion of the corridor since many uses of the corridor are non-income producing (drainage ditches, fencing and areas reserved for future railroad tracks). For these reasons, this method is unsuitable for valuing a corridor.

Developing a New Methodology

The key to this new methodology is to view the corridor as a cross section (see page 7). The corridor within the corridor as stated for this example is a 16-inch water line. To estimate its value as a percentage of fee, the accepted appraisal methodology of the “before and after” rule is applied. Normally this approach is used to measure severance damage. However, when placing a corridor (pipeline) use within a corridor, severance damages should not be an issue. The engineer and the potential user can work together to place the pipe so that it will not affect existing or potential uses.

If there is the necessity to move or relocate an existing improvement, its relocation can be valued on the Cost to Cure basis. The Valuation Calculator below indicates the cross section of the subject 16-inch pipeline within the subject 12-foot easement.

Applying the before and after rule to the 16-inch pipeline area results in the following: another pipeline cannot be placed here nor penetrate this area with poles, towers or other permanent surface and subsurface uses. The diagram also shows the 16-inch pipeline surrounded by “risk areas.” The 24-inch risk area dimension on either side of the pipeline was established over many years.

An engineering study recently confirmed that working any closer than 24-inches to an existing corridor improvement requires extreme caution. Shoring and hand excavation of the property may be necessary to attempt to prevent subsidence. The risk area may become very expensive and dangerous to develop. Therefore, the impact on the corridor for the 16-inch pipeline and the risk areas are the same.

Applying the “before and after” rule to the pipe and risk (64 inches) results in a condition where most of the rights in this portion of the corridor are gone. The impact in the area of the example is estimated to be 85 percent, not 100 percent, because some rights remain. The 64 inches of the corridor can be used for spur tracks serving adjacent industries. This area can also be used for the temporary storage of railroad materials such as rail and ties. It could even be a part of the maintenance roadway

for the entire 100-foot wide corridor. Therefore, 15 percent use remains.

The remaining 80 inches (the outer 40 inches of the easement) is impacted less than the pipe and the risk area. This portion of the corridor in the example can be used as an overlap, or buffer zone to other corridor uses. This area has a value equal to one half of 85 percent or 42.5 percent.

Calculating Value - A Percent of Fee

$$64" (16" + 24" + 24") [144" (12 \text{ ft.})] = 44.4 \% \times 85 \% = 37.8\%$$

$$80" (40" + 40") [144" (12 \text{ ft.})] = 55.6 \% \times 42.5 \% = 23.6\%$$

TOTAL 61.4% (% of Fee)

Value of Corridor Within a Corridor

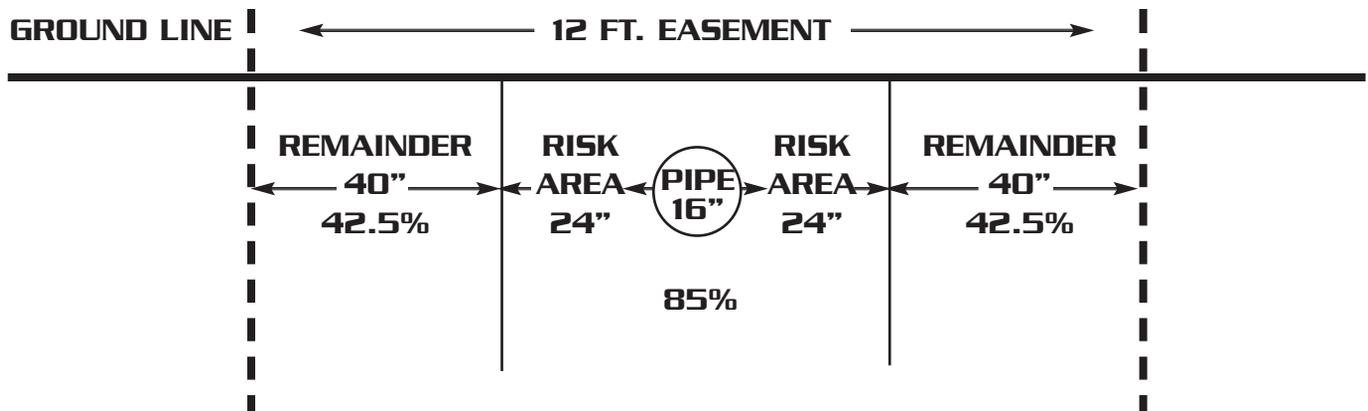
$$\text{ATF} \times \text{Enhancement Factor} \times \% \text{ of Fee} = \\ \text{Value of Corridor Within a Corridor}$$

By use of this methodology, corridor appraisers can better quantify the percentage of fee and arrive at a value that is just and equitable for the corridor within a corridor. ■

Richard Zulaica is a transportation corridor consultant/appraiser from Pleasant Hill, Calif. near San Francisco. He was a real estate appraiser with the Southern Pacific Railroad Company for 30 years, where a majority of his time was devoted to the appraisal of portions of the railroad's 15,000 miles of transportation corridors throughout 15 states. Over the past two years, he has performed independent evaluation services for transportation interests.

Use of the proposed new approach to valuing a corridor within a corridor will better quantify the percentage of fee value.

VALUATION CALCULATOR



VALUING A GAS PIPELINE EASEMENT

A History and Synthesis of Methodology



Originally presented to the Rocky Mountain Mineral Law Foundation Special Institute on Rights of Way, Denver, Colorado May 4 & 5, 1998. The following article is based on an actual natural gas pipeline project for Kern River through Utah. Case studies of potential damages will be found in Part Two, to be published in a future issue of *Right of Way*.

The authors undertook the right-of-way appraisals for a major, primarily new, alignment natural gas pipeline from the Wyoming border through Summit and Davis Counties and the populated part of Salt Lake County in Utah during the early 1990s.

A 36-inch pipeline needed to be installed. Through portions of western Salt Lake County, the alignment was to go along an existing Utah Power & Light (now Pacificorp) electric transmission line corridor.

The project required preparing a study addressing appropriate compensation for the proposed pipeline as well as potential damages. We would use this study in estimates of a value range and the size of damages for more than 400 parcels of

Pipeline Easement Description

To understand the effect of a proposed pipeline easement, we must first understand which rights of the total bundle of rights are to be acquired. The easement to be used is to be an Exclusive Right of Way and Easement. The word exclusive an important one.¹ It carries with it certain restrictions and guarantees.

For example, the restrictions on the fee simple ownership in the Kern River include the following: the right of ingress and egress to and from, on and along the right of way. The Grantee (Kern River) has the option to put in any size pipe they desire. During temporary periods, the Grantee may use portions of the property adjacent to the right of way acquired. The Grantor

Some of the guarantees made in the easement agreement are:

- The Grantee will compensate the Grantor for all damages to real or private property.
- The right of way will be restored and shall include final grading, reseeding and installation of erosion control structures.
- The Grantor reserves the right to use and enjoy the property affected, subject to the restrictions.
- The pipeline will initially be buried at least 30 inches deep.

Compensation

The preferred method for determining the value of an easement would be to find paired sales, with and without similar easements. It is difficult to find a “paired

easement. Chances of finding such a situation from which to derive an appropriate compensation amount are limited.

In lieu of indisputable market data support, we turn to interviews of market participants who often deal with easements, in order to understand the practice and custom of this particular industry’s precedents. This methodology is the subject of an ongoing controversy, which we will address in the conclusion. We made our first interviews in the late 1970s. We interviewed again in the late 1980s and again in the mid-1990s, so this is a historical continuum.

Part of the fee simple interest is lost to the property owner as a result of an easement taken. In an earlier, related study in the 1970s,



land from grazing use to residential and industrial uses. There were 38 orders of occupancy taken (less than 10 percent) condemnations. Only 25 of those that could not be settled after the orders were granted required full “before” and “after” appraisals. Ultimately, all were settled except one that went to a special commission hearing.

(property owner) may not interfere with the Grantee’s surface or subsurface rights or disturb its facilities. No road, reservoir, excavation, change in surface, grade, obstruction or structure may be located within the right of way without the Grantee’s prior written consent.

sales analysis” with similar circumstances to measure the appropriate compensation amount from the market. To do so, we would need to find two sales that are similar in all characteristics, with the exception that one has a 50-foot wide pipeline easement and the other has no such

we had the opportunity to interview several utilities and ask what methodology had been historically used in determining just compensation for easements acquired.

Interviews and Research

Tracy Shepherd, former Acquisition Manager with Mountain Fuel Supply Company, explained that they paid a minimum of 50 percent for easements on any

***By William R. Lang, MAI
and Brett A. Smith***

GAS PIPELINE EASEMENTS

parcel with a significant market value. They paid by the lineal rod for easements in outlying areas.

Rex Johnson, when he was with Northwest Pipeline, mentioned an example in Payette, Idaho, where they paid 50 percent of the fee simple value for commercial and industrial land to be used in conjunction with a new pipeline. They only paid 25 percent of fee value when adding to the width of their existing right of way. Utah Power & Light pays up to 60 percent of fee value.

Max Derbes, Jr., MAI, wrote an article that appeared in *Right of Way* magazine in February of 1973. It explained how his court experience in this type of easement typically showed a compensation from 50 to 75 percent of fee value through croplands for transmission lines.²

Another article in *Right of Way*, dated February 1968, was written by William O. Ewing, Jr., then Vice President and Regional Manager of Right of Way Associates.³ That article mentioned that a major pipeline transmission company in the Pacific Northwest develops a comparable appraisal map prior to establishing the offering price for rights of way. Landowners are offered amounts based on 60 percent of the appraised value. This is for agricultural land and crop damages are additional.

Ewing said that, normally, compensation for easements ranges from 50 to 100 percent of the fee value and consequential damages are paid, if any. Consequential damages arise as a result of a taking, and/or construction on other lands.⁴ For non-agricultural land, consideration is given for the loss of potential for development, as well.

Foster Lamb, formerly of the Bureau of Reclamation, said they paid fee simple value for a half acre area around transmission towers and 25 to 50 percent of fee for the transmission line easement areas.

Dean Brown, of the University of Saskatchewan, BC, in a study published in January of 1976 reported that local electric utilities are paid 30 to 50 percent of fee value for transmission lines.⁵

Consequently, those acquiring

pipeline rights historically paid 50 percent of fee in the 1970s. Some paid 60 percent and compensation reportedly went as high as 100 percent. Transmission line easements were 25 to 75 percent of fee value then. Damages were estimated on an individual parcel basis.

To see if this information was still up to date in late 1989, we interviewed Carl Meyer, who was Chair of the International Right of Way Association's Pipeline Committee and Supervisor of the Land and Right of Way Department for ARCO Pipeline Company in Independence, Kansas by telephone. He explained that compensation for a typical easement was based on a percent of the fee simple market value, or on a cost-per-lineal-rod basis. He explained that if the size of the gas pipeline being put in were small, compensation would be 50 percent of fee value. However, if it is larger, as in this case with a 36-inch line, compensation should be higher or 75 to 100 percent of fee value in his opinion (damages within the right of way included).

We also spoke to Don Zimmerman,

Principal of Z-Land Services in Huntington Beach, California, on October 3, 1989, who was currently working on the UNOCAL pipeline. He had 26 years of experience with right-of-way acquisition and pipeline easements. He said that he was negotiating land on a cost-per-lineal-foot in his current project, but that if the percent of fee value method is used, 50 percent of fee is typically paid for the right of way. Damages outside the right of way would be estimated on an individual parcel basis and would be in addition to the 50 percent of fee amount.

We spoke to Jack McDonald, Chief Appraiser for the Bureau of Land Management for the state of Utah, who told us that at that time there were typically two ways to acquire easements for pipelines: by a percent of fee simple market value or by the lineal rod. The government typically required 40 percent of fee value. Compensation by the rod is typically used for land with market values less than \$1,000 per acre. McDonald said he has heard of compensation for pipeline easements ranging from 40 to 70 percent. This would only

Interviews and Research Summary Chart

Contact	Company/Source	% of Fee Paid for Permanent Easement
Chris Guinn	Alyeska Pipeline Project	50%
Tracy Shepherd/ Tim Blackham/Don Moore	Mountain Fuel Supply/Questar Gas	50%
Joe Rogoiwo	Exxon Pipeline Company	50%
George Adams	Chevron Pipeline Company	50%
Rex Johnson	Northwest Pipeline	50%
Kirk Morgan	Kern River Pipeline	50% to 75%
Foster Lamb	Bureau of Reclamation	25% to 50%
Dean Brown	University of Saskatchewan, BC	30% to 50%
Don Zimmerman	Z-Land Services	50%
Jack McDonald	Bureau of Land Management	Leases based upon 40% of fee value calculation
Carl Meyer	IRWA Pipeline Committee	50% for small diameter, 75% to 100% for large diameter pipelines
Max Derbes, Jr.	IRWA Article	50% to 75%
William O. Ewing	IRWA Article	50% to 100%

be attributable to the right of way put under easement. Damages would be an additional amount to be added to this by the judgement of the appraiser, or by negotiation.

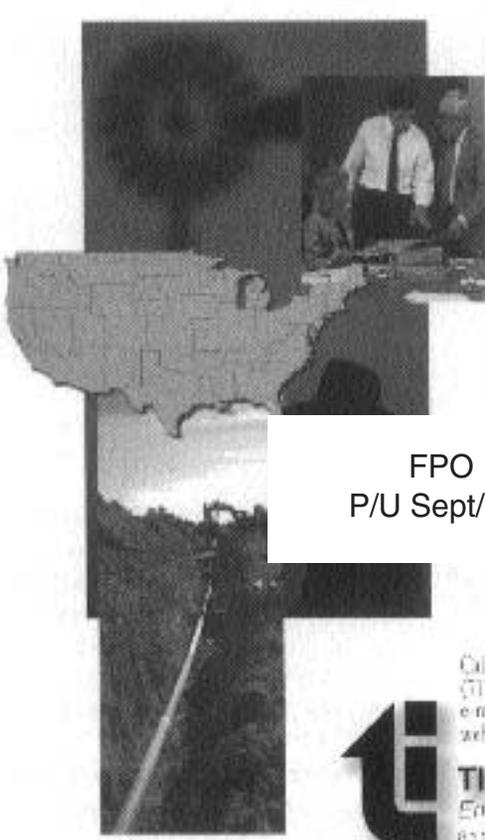
That information adds to and supports the information we had acquired. In our opinion, the appropriate method to estimate the amount of compensation for the right of way is to apply a percent of the fee market value to the easement area. The percent of fee simple value paid should be 50 to 75 percent in the late 1980s, typically 50 percent, in our opinion, plus actual damages caused by construction if not corrected (crop loss, trees, fences, outbuildings, compaction, etc.).

Temporary Construction Easements

Meyer said that if a temporary easement were required, 25 to 50 percent of fee was typically paid. We have made numerous appraisals involving highway construction or widening where temporary construction easements were required. We have generally treated compensation for them as a rent on the land during the period of construction only, and not as a percent of fee value for the land affected. We believe this is a more accurate method of compensation since the land is only temporarily affected.

Kirk Morgan, Manager of Right of Way for the Kern River Gas Transmission Company in 1989, explained that the construction period for the pipeline would typically be from six to eight weeks, maximum.

To pay 25 to 50 percent of fee value for this short amount of time would be excessive in our opinion. To estimate the yearly rent for the land, we estimate the market value of the land and then typically apply a 10 percent of fee value land rent over the construction period, plus any actual damages not corrected. The local long-term land rental in this area is 10 percent. Check for local support in your area. We are not asserting that long-term rental rates are the same as short-term rates as we have not studied that issue. ➤



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Handling Damages

Meyer explained that the best method of handling damages is by what he called “pre-settlement” estimates. That means to estimate them before piping instead of a “wait and see” agreement where claims never quit. He said that if the pipeline is going through industrial or pastureland, damages are minimal or

non-existent. In cropland areas, the total amount of bushels per acre lost should be estimated and paid for up front to avoid future crop loss claims.

Meyer said that no damages are applied to the remainders of affected parcels. Any real or perceived damages to the remainders are considered to be compensated for by paying a percent of

fee value for the land affected within the acquired right of way, or are included in the amount paid per rod. We disagree with this concept and believe that additional compensation may be required if the easement is situated in such a way as to encroach on existing improvements, or if it renders the remainder less usable.

Meyer suggested two factors that could be included as part of the construction engineering and could help reduce possible damages. First, the pipeline should be buried four to five feet deep. We noticed on the easement document to be used in conjunction with the instant project that the Grantee guarantees to bury the pipeline at least 30 inches deep. We suggested that this depth be increased.

Kirk Morgan, with Kern River, explained that they intended to bury the pipeline at least five feet deep in the agricultural areas. This means five feet of fill on top of the three-foot pipe and perhaps an additional one-foot below that, or a potential nine-foot deep trench. This is to avoid conflicts with farming machinery that may dig deep into the soil. They are considering keeping it that deep in areas near transmission lines to avoid potential damage caused by the heavy equipment used to repair and maintain them.

Second, Meyer suggested a “double ditch” method, which allows the topsoil to be separated from subsoil and not mix them together. In this manner, the poor soils can be pushed back first and the topsoil is saved. Morgan explained that Kern River used the double ditch method in agricultural areas to salvage as much topsoil as possible and filled it in last.

Morgan also explained that the pipeline in the Salt Lake area segment would be in a Class 3 location. The pipe in this location has to have x-rays of 100 percent of all welds on the pipe; and it goes through stringent testing requirements. It has extra thick walls. It is operated at a maximum allowable operating pressure of 60 percent of its designed strength, which is a not quite a double design factor.

[RIGHT OF WAY ACQUISITION SHOULD NOT BE]

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It is possible, in our opinion, that the remaining parcel can be damaged by a pipeline crossing a parcel and that compensation may be required beyond that paid for land and uncorrected damages within the right of way. In such a case, a complete "before" and "after" appraisal is indicated.

Utah Power & Light Properties

Utah Power & Light Company has fee simple interest in most all of their parcels affected by the new pipeline that we will be involved with. Compensation for the Utah Power & Light land affected by the pipeline easement imposed upon it should be handled the same as for any other fee simple owner; that is, 50 to 75 percent of fee simple value in our opinion. The fee simple market value of the narrow strips of Utah Power & Light land is considered to be the same as adjoining land values, or "across the fence" values.

Private Owner with Existing Easement

We have been informed that some subject parcels that are privately owned have existing easements for transmission lines that will be additionally impacted by the pipeline easement. This complicates the determination of compensation for such areas. Neither the first utility company, nor the property owner, has total control over all the bundle of rights within the existing easement area.

According to our sources, Utah Power & Light typically pays 60 percent of fee value for their easements so we assume they have 60 percent interest in the affected right of way property. There remains the other interested party, the property owner, who has a 40 percent interest. Who should receive compensation for the right of way to be put under new easement? Who should be paid damages? Should the property owner receive compensation for the right of way to be acquired based on his ownership interest of 40 percent of fee value? Or UP&L, based on their 60 percent interest? Or both?

Jack McDonald of the Bureau of Land

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Management explained that with an easement within an easement situation, or shared corridors, the first utility has typically already gained control over that area within the original easement, unless otherwise stipulated. They often retain the right to put in an additional line. The property owner (or the party with 40 percent interest) may or may not be able to give permission for another utility to use the same easement, if it is an “exclusive” easement. The wording of the easement agreement is critical. (Barnes)

Permission for a second utility to use this same right of way under an existing easement must be gained, either voluntarily or through condemnation, from the first utility company. Therefore, although the property owner still has an interest in the easement area, he does not receive any compensation from the second easement for the acquisition of the right of way according to

Permission for a second utility to use this same right of way under an existing easement must be gained, either voluntarily or through condemnation, from the first utility company.



right of way for the new gas line easement. Any uncorrected damages within the right of way should be paid in addition. Damages to the remainder of the existing easement

are also possible. These would have to be estimated on an individual basis.

In our opinion, regarding compensation for the shared right of way to be acquired and damages within the new easement, Utah Power & Light should receive 50 to 75 percent of their interest (say 60 percent) in the fee value, or 30 to 45 percent of the fee simple value. The property owner receives 50 to 75 percent compensation for his interest (say 20 to 30 percent) in the right of way acquired, (unless the easement agreement is specifically exclusive). The parties may be entitled to just compensation for a temporary easement during the construction period. This could be determined in the same way as for temporary construction easements in our opinion; or perhaps in the negotiation process.

Damages to any remainders that are not considered to be compensated by

the 50 to 75 percent for the land encumbrance would need to be estimated individually in specific “before” and “after” appraisals on those parcels.

This study was again updated in May 1995. We re-contacted some of the same interview participants where possible, or the appropriate person from the various sources to update our on-going study. Their comments are summarized by source as follows:

IRWA Pipeline Committee

Alan D. Wurtz, SR/WA, was the 1994-95 Pipeline Committee Chair for IRWA. He was cooperative in answering questions about the permanent easement compensation custom for his seven state wide area (including Oklahoma and Missouri). He also offered to pose our questions to the Pipeline Committee members who would be meeting on April 29, 1995 at Durango, Colorado and would give us their responses. The members of the Pipeline Committee represent the 48 mainland United States and would provide us with a feel for national trends.

Wurtz explained that in his experience, compensation for permanent easements typically begin “and hopefully end” at 50 percent for the underlying market value as a starting point. However, after

negotiations it can go as high as 100 percent or more of the underlying fee value in some cases where there is particular need for a certain parcel, or there are other extenuating circumstances. He said that this method is used for both rural and urban areas, but that he has noticed a recent trend where landowners in more urban areas seem to be more knowledgeable of real estate related issues and are requiring compensation amounts toward the upper end of the range.

We spoke again to Wurtz after this meeting in Durango, Colorado with the IRWA Pipeline Committee. He said that the pipeline companies represented at the meeting included Southern California Gas, ARCO, AMOCO, B&P Oil, El Paso Natural Gas, Williams & Williams Gas, ENRON, EXXON (represented by Haskall Rogers who would become the Chair for 1995-96 of the IRWA Pipeline Committee), Pacific Gas Transmission, NAPCO and Shell Pipeline. He said that they discussed the issues we had included in our questionnaire and had collectively agreed that for compensation of permanent easements in urban areas, 50 percent of the underlying fee value is the opening negotiating point and where they try to stay. More may be paid depending upon how resistant the owner is and how much they need the parcel. In rural areas, permanent easements are paid based upon the going rate of the cost per rod in the area. Where there are many pipelines in an area, there is typically a going rate that everyone is using and which the farmers usually agree to.

For temporary easements, compensation is based upon the actual loss to the owner. This is often times an area used for a "fudge factor" in negotiation as a way to give an owner more money to increase chances of settlement. The underlying value of the land is often used as a basis and there are instances where a rent on the land based on yield rates derived from land leases are used over the period of the easement.

Damages inside the permanent easement area are considered in addition to

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the 50 percent of fee paid. Either the construction crew will make restoration efforts to reestablish the area as it was in the before condition, or actual replacement costs are paid to the owner so he can do it himself if he so desires.

Damages to remainders outside of the easement area are also in addition to the compensation paid for the permanent or temporary easement and are estimated on a case by case basis. Consideration is given to potential development before and after the project (lost lots, increased development costs, access).

Questar Pipeline Company

Timothy R. Blackham is the Director of Property and Rights of Way for Questar Pipeline Company based out of Salt Lake City. They manage high-pressure transmission pipelines carrying natural gas. He said that their company uses 50 percent of the underlying land value as a starting point for permanent

easement negotiations for these pipelines. He said that this has been the custom for many years and is used from agricultural type land to more urban type land uses. He is unaware of any situations where any pipeline has caused damages to the remainder in the form of a loss of market value. Blackham also said that for pipelines in very rural areas, he uses a compensation amount per rod for permanent easements).

We found in recent conversations with landmen (land persons) in the Oklahoma area that per-rod payments for pipelines are \$7 to \$20 per rod depending on the size of the pipe. Payments go up to \$40 per rod (this converts to \$4,224 per acre x 50 percent for a 50-foot wide easement).

Blackham mentioned that in his experience, he has found no instances where a property suffered value loss as a result of proximity to a natural gas line. He said that the only cases where damages occurred outside of the easement area were where the pipeline went

through a parcel in such a way as to impede or hinder development.

In such cases, damages usually occurred to the remainder and the larger parcel was often purchased rather than just acquiring an easement on a portion of it.

Mountain Fuel Supply Company

Donald D. Moore, Jr. is a Right of Way Agent for Mountain Fuel Supply Company (now Questar Corp). He has been involved with purchasing rights of way for distribution pipelines for 3 1/2 years. He said that the typical amount of compensation for permanent easements is 50 percent of the underlying land value. Moore explained that in most cases, he is able to cause very little disturbance to properties encumbered by MFS easements because they have a lot of flexibility on where they can put their lines and are usually able to put them along property lines or in setback areas causing only minor disturbances. However, in cases where this is not possible, they have paid up to 100 percent of the underlying fee value, or purchased a parcel outright.

Utah Power

Keith Corry is the property manager for Utah Power (formerly Utah Power & Light, and now a part of PacifiCorp) and is familiar, after seven years experience, with what is paid for permanent easements for transmission line corridors. He said that the amount of compensation for permanent easements for his company depends on the size of transmission line being placed in the easement. He explained that for a 46kv to 138kv line, 60 percent of the underlying fee value is typically paid. Where the line is larger, say up to their largest of 345kv, the percent of the underlying fee value paid increases up to 100 percent. Rather than pay more than 100 percent of fee value for an easement, his company will often purchase the strip in fee value if possible, or even purchase the larger parcel being impacted by the transmission line.

As a side note, Corry said that he did

EASEMENT CORRIDOR FOR SALE

LOCATION: N. E. Pennsylvania extending northward from East Stroudsburg Boro to Blakely Boro near the City of Scranton

LENGTH: Approximately 40 miles

WIDTH: 200 feet & 150 feet (with 50 ft. trim area)

GENERAL: The easement corridor was assembled for an electric transmission line, which was never built. Survey information for the corridor is up-to-date.

CONTACT: For additional information contact:

Kathy Seyler or Tom Clime
GPU Energy Real Estate Dept.
2800 Pottsville Pike
Reading, PA 19640-0001
610-921-6671 (fax 610-939-8579)



his thesis in college on the impact of electromagnetic fields on property values and that he has several such studies on file, which show little to no impact to property values resulting from proximity to power lines or EMF. He did say that in some cases, stigma was evident, but only in the form of longer periods of marketing time. He provided us copies of some of these studies.

Bureau of Land Management

Jack McDonald of the BLM said that they do not grant permanent easements, but now rather give right-of-way grants, Temporary Use Permits (TUPs), or leases to parties requesting rights of way across BLM land. These leases can be renewed without difficulty, but are subject to reappraisal every five years. The methodology used in determining the amount of rent to be paid for rights of way depends on the value of the underlying ground.

Where land is located in more urban locations, and therefore has a higher underlying value, it is appraised and the rent is estimated based upon 40 percent of the fee simple land value. Once that is determined (40 percent of the fee value), a rent is established using an annual return requirement, currently around 8.5 to 9 percent. This calculates the annual rental of the 30-year lease to be paid to the BLM for the right of way.

Where the land is very rural, the value is determined by an amount per rod, usually \$10 to \$20 per rod and then a rent is determined based upon that amount. Congress has developed a schedule for rural land designed to cut down on costs and time for appraisals. Blanket land values are used for specified zone values within large, generalized areas for each particular county in each state. The amounts are tied to a conservative index (The GNP implicit Price Deflator Index, less than the CPI) and updated annually.⁷

Conclusion

There has always been an argument between those who contend that the only true measure of compensation for

easements is "Paired-sales analysis," and practicing right-of-way agents. Gordon Green in his 1992 Appraisal Journal article, "... a common sense approach," says that paired sales are the only measure of fair market value, "as opposed to precedent actions."⁸ He is saying that you can't pay what others pay. You will pay too much that way. You have to prove it in the market by "paired sales."

Max Derbes in his 1973 articles says it both ways. "After measuring the true economic impact (primarily by sales with similar conditions ...) then the law and local jurisprudence must be considered. For instance, in Louisiana jurisprudence, the courts have held ... that 50 to 75 percent of fee value for the same rights through crop lands" is proper. "The application of laws or jurisprudence or even practice is in the realm of custom and only indirectly relates to the value science or art." (Derbes)

After more than 30 years of practice in right-of-way appraising, we think their differences are semantics and not substance. First, the "realm of custom" is the real world in which purchasers of right of way operate. "Precedence" is what just occurred on a nearby or previous pipeline acquisition.

If "custom" and "precedence" in the area is ignored on the pipeline project to follow nobody will be able to purchase any new rights of way. The real common sense is to follow local custom and precedents.

Is this a violation of "fair market value?" we think not for the reason that right-of-way acquisition is a sub-market all its own. There are few sales of 50-foot wide strips of land. If 50 percent of fee simple value is local, or industry, custom and precedent then that is the sub-market value and those easement purchases are the most comparable sales.

Is there really a contradiction between the authors of all the articles in the attached bibliography? If we analyze precedent easement purchases as sales, paired against the "before" fee value, we have specific sub-market transactional data. Yes, it is under the threat of

Cont'd on page 47

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GAS PIPELINE EASEMENTS

Cont'd from page 33

condemnation, but all easements are. We have a recent sale of a right of way between two private parties without the power of condemnation that follows custom at 50 percent of fee value.

This is our advice: Pay for rights of way based on custom and precedents. Then, if condemnation is necessary have it appraised on a "paired sale" basis (which will probably be lower) or whatever local courts require and try the case on that basis.

The majority of responses from the local sources indicated that compensation for permanent easements acquired for use in right of way corridors, particularly for underground pipelines, begins around 50 percent of the underlying fee simple land market value in urban or suburban locations across the country, over the years. This is strongly supported by the national information provided by the IRWA Pipeline Committee discussions.

Utah Power paid 60 percent of fee value for permanent easements in their corridors, but transmission lines are more visible and harder to work around. The 40 percent of fee value used for charges by the BLM is not for a permanent easement, but rather is the basis for a 30-year lease rental rate and is not directly comparable (The smaller the interest received the lower the payment?).

The values paid in the late 1930s and early 1940s of \$0.25 per rod increased to \$1 per rod in the late 1940s and early 1950s when most pipeline mileage was constructed. Since the late 1950s the acquisition process became more complex due to increased land prices and urbanized locations. (Ewing)

In recent years the grantor has become more sophisticated (whether public agencies, corporations, or individuals). The price paid tends to continue to rise and is much higher per rod now. It has to be higher to keep up with inflation since it is a fixed payment and not a percentage of fee value.

Pipeline easement compensation has been relatively stable for 30 years at around 50 percent of fee simple value. This keeps up with inflation as fee simple values increase. Since values tend to be in flux, studies should be made for each new project by a qualified right-of-way appraiser. Surveys of current custom and practice should be made.

In our opinion, the appropriate method for determining compensation for a permanent underground pipeline easement and damages within the right of way is a percent of the underlying fee simple land market value. Based upon custom for local utilities of this nature, the appropriate percentage of fee to be paid is 50 percent in our opinion. This is supported by information both locally and nationally and by other types of easement, or lease compensations. ■

Notes

1. Only where the grant conveying the easement specifically characterizes the easement as "exclusive" does the grantor lose the right to use the easement in common with the grantee. *Bergen Ditch & Reservoir Co., W. Barnes*, 683 p. 2d 365 (Colo. App. 1984).
2. Derbes, Max Jr., "Electric Transmission Right of Way Policy," *Right of Way* (Feb. 1973) pp. 20-23.
3. Ewing, William O. Jr., "Offering Prices for Pipeline Rights Evaluated," *Right of Way* (Feb. 1968) pp. 44-47.
4. Byrl Boyce, Ed., *Real Estate Terminology*, AIREA 1987. Quoted in Eaton "Real Estate Value in Litigation" 1995
5. Brown, Dean J.A., "The Effect of Power Line Structures and Easements on Farmland Values," *Right of Way* (Jan. 1976) pp. 33-38.
6. An easement that either expressly permits the use of the land within the easement by others, not only by the holder of the right-of-way but also by the owner of the servient estate (fee simple) and even by others to whom like easements are given, or that is silent on the issue of exclusivity of use results in a non-exclusive easement. *Robt. Jackson Real Est. Co. Inc. v. James* 755 S.W. 2d 343, 346 (Mo. App. 1988).
7. A more specific current analysis of BLM requirements is given in "Access Issues and Public Lands Rights of Way," Mark D. Bingham, *Public Land Law II* (Rocky Mountain Mining Law Foundation 1997) pp. 7-11 to 7-15.
8. Green, Gordon, MAI "Easement to Fee Simple Value Ratios for Electric Transmission Line Easements: A Common Sense Approach," *Appraisal Journal* (July 1992) pp. 399-412.

Other Resources

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Kinnard, William N. Jr., Dr. "Measuring Residential Price Impacts from Proximity to Natural Gas Transmission Lines," *REGC Inc.* (June 1991). P.O. Box 558, Storrs, CT 06268; (203) 429-1005

Dowell, Carr T., III, "Appraisal of Pipeline Right of Way," *Right of Way* (June 1984).

McCloud, Howard D., "800 Pipeline Condemnation Cases Later," *Right of Way* (April 1974) pp. 20-23.

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Brownell, Keith W., "Valuation of Pipeline Easements," *Appraisal Journal* (April 1958).

Howard, William F., "Right of Way Valuation and Acquisition," *Technical Valuation* (Nov. 1955).

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Part Two



Along with Part I (Right of Way, September/October 1998) this article was originally presented to the Rocky Mountain Mineral Law Foundation Special Institute on Rights of Way, Denver, Colorado May 4 & 5, 1998.

Setting Value on a Gas Pipeline Easement

Case Studies of Potential Damages

By William R. Lang, MAI and Brett A. Smith

The damage appraiser's task is to find market evidence that would be useful in discerning damages, if any, to residential land because of a high-pressure natural gas pipeline located on or near a residential site. The accepted method of approach is to find a residential area that has a high-pressure natural gas line near or on residential properties.

The objective is to find sales of lots which are near a gas line (to simulate the subject after condition) and compare them to similar lots in the same locality that are not near a gas line (to simulate the before condition of the subject parcels). In that way, we can see if the market indicates a penalty for the gas line being on or near specific parcels.

The most desirable market data would be pertaining to vacant land. It is preferable to find undeveloped lot sales in these conditions, rather than lots that have been improved with residences, because of the differences in value caused by variations in the dwellings on the total sale price. When vacant lot sales are used, it reduces the number of variables and the differences in value are more easily attributed to the impact of the gas line, if any.

Our first study area was acreage for a subdivision near the block "U" by the University of Utah. We had information on file of acreage sales in that area and were familiar with the location of pipelines in that area. One of the pipelines in that subdivision was a high-pressure Mountain Fuel Supply natural gas line. There were two Chevron crude oil lines.

The 20-inch Mountain Fuel Supply line was found to pass between the Tomahawk Drive properties and did not affect the sale of those lots according to the developer. We spoke with one owner, an attorney, who lives on Tomahawk Drive. The Mountain Fuel Supply pipeline runs adjacent to his home. (The same gas line comes down Emigration Canyon in another case, which follows.) The owner built alongside the pipeline with knowledge of it years ago and doesn't worry about it.

In May 1993, Russ Watts verified the acreage sale description. He explained that although negotiations originated in July 1988, the deal did not close until April 1993. First Charter Development Corporation simply passed title to Watts 89 on the same date at the same price. It contained a 20-foot high-pressure Mountain Fuel Supply gas pipeline and two

GAS PIPELINE EASMENT

Chevron crude oil pipelines through the middle. The only other sale on the north bench of Salt Lake City sold for roughly the same price and contained no pipelines. Therefore, no diminution in value may be attributed to the pipelines.

The new subdivision for that parcel has already been platted for 35 lots. The lots range in size from 0.6 to 0.9 acre and are available for \$125,000 to \$190,000 per lot. They have been on the market since the beginning of May 1993 (without an onsite office or even access roads open to buyers) and 10 of them already have offers and should close soon.

Some of the lots under contract of sale adjoin the relocated high-pressure natural gas lines. One of the gas pipelines comes down Emigration Canyon. Together with the Chevron Lines, it passes next to the Children's Center at Medical Drive. The Moran Eye Center at the University of Utah Hospital is less than 100 feet from it. It goes north across the previously mentioned attorney's property on Tomahawk Drive.

The other 24-inch high-pressure gas transmission line goes south out of Emigration Canyon to the pressure reduction station at Bonneville Golf Course. All of the condominiums on Kennedy Drive east of Oak Hills, such as Canyon Crest and Canyon Cove, were built around that gas line.

Mr. Watts said that there is no difference in price or holding period for lots backing onto the gas lines compared with those that do not. He estimates that it will take 12 to 16 months to sell all 35 lots. Again, there seems to be no effect on upscale view lots on the northeast bench of Salt Lake City above Federal Heights from large gas or oil pipelines.

The second area of study was the Emigration Oaks subdivision up Emigration Canyon. In that area, two high-pressure Questar Transmission gas lines continue with an easement across the rear of some lots.

As they come out of Emigration Canyon, one line turns north as a Mountain Fuel Supply transmission line that runs near the block "U" and the other one runs down out of the



canyon past Kennedy Drive to the pressure reduction station.

We also drove 1700 East from Draper into Sandy from 12000 South to Dimple Dell Road. There are many homes along that pipeline with paddles in their backyards. We followed the pipeline from La Caille Restaurant up Wasatch Drive to the Mountain Fuel Supply pump station in Bonneville Golf Course, over 11 miles with thousands of homes along it.

There are pipelines alongside Alta View Hospital, St. Marks Hospital and Shriners Children's Hospital as well as University of Utah Hospital. The whole urban landscape is crisscrossed with pipelines fronting businesses ranging from REI outdoor gear retailers to McDonalds restaurants as well as homes, apartments, retirement residences, nursing homes and condominiums. Most of the owners would only know of the pipelines by investigation, although many properties like the hospitals have paddles alongside.

Emigration Oaks Subdivision

Based on the three locations studied, the best source of market data regarding the impact of a high-pressure natural gas pipeline on residential properties was found in the Emigration Oaks Phase 1A subdivision. We were able to locate many sales of sizable, vacant, residential lots. Some of the lots sold had easements with two high-pressure natural gas pipelines and two large petroleum pipelines across the rear portion of them.

Other lots have an AT&T easement for a fiber optics line running through them. There are sales of several similar lots in the same subdivision with which to compare these various lots to check for any differences in market value resulting from the easements. The area of the easement is marked and trees have been removed within the parameters of the easements.

The plat shows the location of the various lots in what is called the

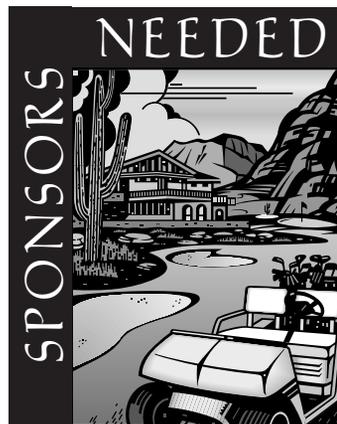
Emigration Oaks Phase 1A subdivision. There is a pipeline easement approximately 100 feet wide for the Questar natural gas lines and the Chevron petroleum pipelines. There is also an easement for the AT&T telephone line. All of the lots are reported as sold with the exception of Lot 35, though information was available on only 23 of them.

Lots 36, 37, 38, 39 and 40 all have the natural gas and petroleum pipelines easement along the rear of the lot. Lots 1, 2, 5, 6, 7, 11, 35 and 36 are impacted by the AT&T telephone line. It is necessary to examine the sales with a natural gas easement and compare them with sales of other lots in the subdivision to see if the market indicates a disadvantage for the existence of these easements.

Tim Blackham with Questar was contacted to find out about the two natural gas pipelines. He explained that the first pipeline was laid around 1929 and was 18 inches in diameter. Then, in the 1950s, a 24-inch pipeline replaced the first line and an additional 20-inch line was laid about 10 feet away, parallel to the first. It is interesting to note that the easement and pipelines were in place years before the Emigration Oaks subdivision was developed, indicating that the developers did not purposely avoid developing near the easement.

Mr. Blackham explained that the Department of Transportation might be changing their standards regarding the thickness of the pipeline walls required for high-pressure natural gas pipelines in residential areas. That creates a problem for the older pipelines running through the Emigration Oaks subdivision because they will not meet the new standards, when they are approved. Mr. Blackham said that, to his knowledge, the new standards were still not approved as of May 1993.

There is a regulating station near the mouth of Emigration Canyon, near Bonneville Golf Course, which reduces the pressure in the main lines and distributes the gas into distribution lines for the areas they serve. Should the new standards be approved, the regulating station will likely be moved up the



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canyon near Little Mountain, so that the pressure will be reduced before it gets to the residential areas. In that way, the lines may continue their service since they are considered to be in "good shape" according to Mr. Blackham. In that case, Mountain Fuel Supply (an affiliate of Questar that originally maintained the natural gas lines) would resume maintenance of them rather than Questar.

While we had him on the telephone, we took the opportunity to interview Mr. Blackham on the subject of impacts on residential areas from natural gas pipelines. He explained that most of the cases he is familiar with show no marked difference in market value of lots with natural gas pipelines as compared to those without them. However, he said that there have been cases where the pipeline has gone through the most developable portion of the lot and has, in effect, severed the buildable area. In such cases, he said that they typically purchase the entire lot.

He also explained that where an easement is taken, "it is a given that at some time in the future there will be work done" within the easement. In most cases, if work needs to be done, their company will attempt to repair or replace any damages to property or minor improvements within the easement, unless other specifications have been made with the property owner.

An example is the subdivision east of Hogle Zoo on the south side of 800 South, which has a 30-foot easement running through the rear of several lots. Mr. Blackham said that they have been very lenient about allowing property owners to put improvements on the land included in the easement (such as swimming pools or tennis courts). However, the property owners must understand that if they have to come in and tear out the improvements to work on the pipeline, Mountain Fuel Supply would not replace the improvements.

We asked Mr. Blackham if he had any personal experiences, or was aware of any study in which the question of the impact of a natural gas line easement to the remaining parcel was quantified. He

said that he was unaware of any such study and that they have not gone through subdivision in the past 10 years. He said that he also would be interested in the results of such a study.

For comparative background, we spoke to George Adams of Chevron Pipeline Company about their petroleum pipelines that parallel the natural gas lines through the Emigration Oaks subdivision. He explained that they are 10.75-inch lines and the one was laid in 1949 and the other was put in around 1953. Therefore, these lines were also there before the subdivision was developed. The Chevron lines conduct crude oil into the Salt Lake Valley and are not considered a risk for an explosion. The biggest problem caused by a break on one of these lines would be the environmental hazard of an oil spill, which would be the responsibility of Chevron to clean up.

We asked Mr. Adams if he was aware of any studies relating to the impact of easements for pipelines on residential property. He said that he was not aware of any studies of that nature, but said that from his experience, there is generally no impact from such an easement. He also said that he would be interested in the results of such a study.

We made an in depth study of the lot sales in Emigration Oaks subdivision. We categorized them according to various physical characteristics. Separate charts were made for lot sales with the natural gas line and those without it, in order to assist in our study of market data showing the impact, if any, of the easement. We contacted the listing agent, Dick Moffat of the Boyer Company as well as several buyers, to verify the sales data and to interview them on their impression of the impact of the natural gas line easement.

Correlation of Market Data General Indications

The lots in Emigration Oaks range in size of about one half acre to over three acres. Topography, access, tree cover, shape and frontage vary widely on the various lots, though several lots are similar to

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each other. As previously mentioned, all but one of these lots have sold, so there is a considerable amount of market data available for study. We looked at the lot sales in a general way initially, to see if there were any apparent differences in the unadjusted averages of the two types of lot sales (with and without the natural gas easement). Our first observation was the unadjusted average of each set of sales. The sale price of all the lots without the easement has an unadjusted average of \$77,761 with 23 samples, while the unadjusted average of the lot sales with an easement is slightly lower at \$74,300 with five characteristics of the lots. These are close, considering the variety of physical characteristics of the lots. The unadjusted price per square foot of both the lots, with or without the easement, is \$1.43 per square foot. The average size of the two types of lot sales is also close. Our first impression of the general data, before adjustments, is the impact of the easement along the rear of

a residential lot has little, or no, impact on the overall lot market value.

Refining the data slightly by taking out the high and low of the unadjusted averages resulted in a total sale price of \$76,476 for the lot sales without the easement and \$76,500, for those with the easement. These are very close to the same value, indicating that with refinements to the market data, the averages tend to support the concept that there is little, or no impact from the natural gas easement.

We can take the same concept several steps further by refining the average of the lots without the easement to more closely resemble the lots with the easement. Since the lot sales with the easement (Lots 36, 37, 38 and 39) are all rectangular in shape, contain over one acre of land, are wooded with oaks, have average to good access and mild to medium slopes, we took the average of the lots without the easement, which had all of these same characteristics.

That narrowed the sample down to only four sales without the easement, but indicates an adjusted average of \$75,275. That is only slightly higher than the unadjusted price of all the sales with the easement of \$74,300, and less than the unadjusted average of the lot sales with the easement at \$76,500, minus the high and low. Again, after these refinements, intended to more accurately compare to the lot sales with the easement, there appears to be little or no damage caused by the natural gas line easement.

Paired Sales

Another way to make comparisons between the lots is to use paired sales of lots with and without the natural gas line easement, adjusted for any other characteristics. If done correctly, the remaining difference, if any, would indicate the impact of the easement.

We made specific adjustments to numerous paired sales for condition of sale, time, size, shape, topography, oak cover and access to refine the sale prices of the various lots to reflect a difference attributable to the gas line easement alone. We were fortunate to have many sales to work with, which enabled us to make market supported, paired sale adjustments for the various differences in the lots. However, after making several paired sale comparisons to each of the lot sales with the easement, we found no pattern indicated from the market to show the impact of the natural gas easement.

In the course of our investigation, we spoke to several market participants, including the listing agent, Dick Moffat and several of the buyers of lots in Emigration Oaks. Mr. Moffat said that the easements, for both natural gas and AT&T, did not have much impact on the absorption of the lots, but that the clearing of the right of way on the AT&T easement after the lots had been sold did cause problems. He described a specific case involving Lot 7 in which the AT&T fiber optics easement parallels the road, just inside the property line.

The lot was purchased with the easement there and no diminution of value

was apparent when purchased, but then AT&T came through clearing the right of way within the easement. The path is easy to follow through the subdivision because of the long, narrow cut through the trees. In doing so, they took out some scrub oak trees on Lot 7 and caused other problems with the landscaping resulting in a cost to cure of \$7,000. The owner was apparently very upset by that.

Another market participant purchased two lots in that subdivision, one with and one without the natural gas line easement. The most recent sale was a lot with a natural gas line easement, Lot 39. We verified the sale with him. He said that he purchased the lot for \$83,000, cash and that he felt it was an arm's length transaction (or market value). He bought another lot without the natural gas line easement for \$88,000, Lot 32. These lots are similar in most characteristics. They were purchased only three months apart, in late 1990.

Mr. Dean, did not feel that the natural gas line easement had any bearing on the value paid for Lot 39 and that difference in value was attributable to other physical characteristics. Our comparisons of that lot with other sales were inconclusive as to the impact of the easement on lot values, so most weight is given to the opinion of the buyer that the pipeline did not impact his price paid for Lot 39.

Lot 38 is adjacent to Lot 39 and has the same easements along the rear portion. It sold in September 1988 for \$84,000, cash. We compared the lot with several sales that most resembled it, but the market evidence did not show any impact of the easement. It supports the price paid for Lot 39.

Lot 37 is another lot with the natural gas line along the rear. It is a corner lot that sold to an architect in June 1986 for \$76,500, cash. The buyer said that the price was discounted down from \$85,000 for cash and he was trying to resell it again for \$85,000 in January 1991. He explained that he wasn't selling it because of the pipeline, but because of personal conditions. He hoped to be able

to build if things still work out for him. The owner explained that he was careful to make sure that the improvements he planned for the lot (including a three-car garage) would fit with the gas line before buying that lot. He had no problem working around the easement and he felt it had no impact on its value.

The owner is quite happy with the

lot and feels that he paid market value for it. He said the clearing along the easement improved his view down the Canyon and that the deer came along the easement past the lot. Our comparisons of the lot with other paired sales were inconclusive. Therefore, most weight is given to the buyer's opinion that the high-pressure gas lines had no

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impact on its value.

We later contacted that owner to see if he was successful in marketing his lot. He told us he had, indeed, sold the lot in June 1991 for \$85,000. That was 11 percent higher than what he had paid for it five years earlier. He said that the lot sold without much difficulty and with no impact caused by the pipeline. The new buyer was fully informed about it and had no concerns.

Lot 36 is the last sale of a lot with the natural gas line easement we were able to find. The most recent sale of the lot occurred in October 1987. It sold at that time for \$70,000, cash, appreciating 20.69 percent in two years, or 10.34 percent per year from a previous sale of the lot in November 1985 for \$58,000. The lot has the natural gas easement across one rear corner and the AT&T easement along another property line. We compared it to other lot sales that are similar to it in most physical characteristics and closest to the same sale date. There were no patterns showing any impact from these easements.

The remaining lot with the natural gas line easement in the rear is Lot 40. It sold, but both the seller and buyer declined to disclose the price. However,

the buyer is an appraiser and head of the loan operation of a major local bank. He allowed us to ask his opinion of the impact of the easement on what he paid for the lot. He explained that he paid the market value of the lot in his opinion and that existence of the natural gas line easement along the rear of the lot caused him no concern and had no impact on the amount paid.

Summary and Findings

The Block "U" Tomahawk Drive study shows no damage to high end acreage or lots next to a high-pressure gas line either before or after publicity about the Kern River line.

The Emigration Oaks study had an abundance of market data available. The general market data, with both unadjusted and adjusted averages, indicates no impact resulting from the natural gas line easement. The market data is inconclusive when paired sales are used and adjusted for other variable factors. That very point indicates that the pipeline is not a distinct issue for buyers in the residential market.

There is not enough emphasis given the easement by enough people in the market to be able to derive specific

adjustments for it. Even when all factors are precisely adjusted for except for the easement, no damage is apparent from a variety of examples for residential property with a natural gas line easement that runs along the rear of a residential lot. The "no impact from the easement" concept is supported by the interviews with buyers of lots with the easement who by common consent agree that the natural gas line easement has no impact on the market value of the lots in the subdivision.

Contact was made with the seller or seller's agent on all sales. Contact was made with the buyer from three of the five lots with the natural gas easement. In those cases, the buyer claimed to be able to work around the easement and that its existence did not damage the lot value. That view is also supported by interviews with Questar and Chevron representatives.

Inversely, if an easement infringes on the buildable portion of a subject lot, or runs along the front of a lot, damages might appear, based on the opinions of the Questar and Chevron Pipeline representatives interviewed at the outset of the Emigration Oaks study. That position is supported by the views of Dick



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Moffat of the Boyer Company as well as our own. The only evidence from the market is the apparent cost of \$7,000 (or 9 percent of the sale price) as a cost to cure the landscaping impact of the AT&T easement in the front portion of Lot 7.

Damages for specific lots would have to be estimated on an individual basis. If a lot is ruined for development by the location of the pipeline in the buildable area, it should either be purchased in fee simple or damaged down to undevelopable land values, the difference in the before and after value being the compensation due. If the pipeline is at the rear of a site, or located so as not to disrupt the developable area, then we feel that no damages occur to the remainder. That assertion gives the most significance to the Emigration Oaks study.

Dr. William N. Kinnard, Jr., President of the Real Estate Counseling Group of Connecticut, Inc. (REGC), reviewed our

studies. He had been making an in depth multiple regression study of 1,171 sales of houses in 10 towns within one-half mile of three natural gas pipelines in Southern Connecticut. His firm used a 100 percent sample of all reported sales between January 1986 and February 1991. The high-pressure pipelines were built in the 1950s. One pipe was 26 inches in diameter. One was 30 inches and the other was 16 inches.

Dr. Kinnard's study (Measuring Residential Price Impacts from Proximity to Natural Gas Transmission Lines, REGC Inc., June 1991.) showed no difference in results between properties that abutted the pipelines and properties up to 200 feet distant. Our research was referred to in Dr. Kinnard's work. He concluded that, "It is highly likely that the research findings and conclusions developed in this market research study are transferable to other market situations involving proximity to an existing or proposed high-pressure natural gas

transmission line. The conclusion stems from the generally consistent, stable and statistically robust results of the market research analysis."

Therefore, we maintain that no damages exist for residential property from proximity to typical high-pressure natural gas transmission lines. ■

President of Lang, Smith & Boice, Inc., William Lang is an independent fee appraiser and Certified General Appraiser in the state of Utah. A graduate of Stanford University with more than 30 years experience in real estate appraisal, Mr. Lang is an IRWA instructor and member of IRWA Chapter 38.

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APPRAISING PIPELINE EASEMENTS

A Practical Approach

BY GARY VALENTINE, MAI, ASA, SR/WA

The appraisal of pipeline easements is more difficult than one might first assume. This is primarily due to legal issues, partial interest, language used in the easement agreement and scarcity of comparable data. Appraisal assignments for pipeline easements are generally classified into two categories: 1) new or proposed pipeline easements; and 2) existing pipeline easements. Pipeline easements are typically found in conforming size lots that are vacant or improved, or as part of an existing transportation corridor.

Title acquired for pipeline use is most often acquired by easements. This makes transferring the real property relatively easy and free from delays. In addition, environmental studies are often not required when transferring title for easements for pipeline use. The fee owner remains the same, and property taxes are still paid by the fee owner, unless agreed to otherwise, and title reports are often not required, leaving disputed title issues in check. Much of the railroad owned property was acquired through easements under these circumstances, and some language in the easements require the railroad to continue utilizing the property for "railroad purposes." Does installing a new pipeline preserve the railroad's rights to continue utilizing the transportation corridor for "railroad purposes?" These questions have not yet been clearly answered by the courts.

Leases are much like easements, except they have time restraints and limitations.

Licenses are like leases, except they are most often used by governmental agencies and are typically utilized for short term periods of less than one year and are revocable, most often extended and easily renewed.

Scope of Assignment

To satisfy the scope of work for appraising pipeline easements, the following steps are required:

- Identify the larger parcel (contiguity, use, and ownership)
- Identify the taking area for the proposed pipeline easement, and identify placement and extent of the proposed pipeline with the aid of an engineering map
- Review the proposed pipeline easement agreement
- Identify the proposed impact on vertical division, bundle of rights and the highest and best use
- Apply the appropriate approaches to value
- Search for comparables
- Make appropriate adjustments
- Arrive at a final value opinion

“Advance research and preparation is the best way to ensure that the appraisal is supportive and reliable.”

Valuation of Pipeline as Part of Conforming Parcel

A conforming parcel is one where the site and all its improvements thereon meet or exceed zoning code requirements for residential, commercial, industrial or mixed use improvements. Furthermore, it has adequate size, access, necessary depth, functional shape, and overall functional utility.

In order to value a new pipeline within a conforming parcel, one must first value the larger parcel, then value the part taken as part of the whole by determining the value of the rights to be acquired. This is done by estimating the percentage of the fee value through analyzing the vertical division concept. Other ways of determining the value of the part taken is by estimating its value using paired data analysis, and finally by obtaining new studies and surveys.

Analyzing the value of each of the vertical divisions, including sub-surface rights, surface rights and air rights, is very useful in determining its value. In a high density area with high height limits, the value of the air rights may be worth more than the surface and sub-surface rights. In rural areas with low height limits for structures, the surface rights may be the most valuable part. In addition, there are multiple right occupancies as well. This is where the pipeline encumbers multiple divisions, including parts of two or three aspects of vertical rights, including sub-surface, surface and/or air rights.

Paired Data Analysis

Paired data analysis is a quantitative technique used to identify and measure adjustments that isolate a single characteristic's effect on value or rent.

For example:

- 1) A typical 6.5-acre parcel without any encumbrances recently sold for **\$50,000** per acre
- 2) Another 6.5-acre parcel with similar elements of comparison to the previous sale sold with a ½ acre underground pipeline for \$45,000 per acre

Calculation: $((\$45,000 / \$50,000) - 1) = -10\%$

Therefore, adjust comparables downward 10% to unencumbered comparable parcels since the subject is encumbered similarly.

Use Studies and Surveys

Interviewing buyers and sellers of property that is encumbered by pipelines could be helpful in determining the pipeline's impact on property value. Interviewing appraisers who are familiar with, and who often accept such assignments, is also a good source for market data. Reviewing published articles and books can provide significant insight and examining recent case studies concerning the valuation of pipelines or the sale of pipelines through testimonies, depositions or exhibits can often reveal a treasure chest of market data.

Another way of obtaining market data is by sending out letters to property owners whose sites are encumbered by pipelines, as they can confirm rents obtained from a pipeline encumbering their property, or recent sales of property used for pipelines. Other important sources of data can be found through public agencies, through the Freedom of Information Act concerning federal agencies, and the State Records Information Act for each specific state concerning local, county and state agencies. While the lower level public agency employees may not be fully aware of what's available to the public, their supervisors are usually familiar with public information acts.

Severance Damages

There are three specific reasons why severance damages may be appropriate when analyzing the remainder parcel. They include: 1) change in highest and best use; 2) increased cost or restrictions on existing uses; and 3) limits on future development or use.

Severance damages can be estimated by their estimated cost to cure. However, appraisers will want to ensure that the cost to cure is not added to the before and after analysis, as it may cause "double dipping," also known as double counting for damages.

In utilizing the State Rule, benefits offset damages. For example, better access to the subject site is possible along with superior physical characteristics to the remainder in the after condition

following the new construction. Likewise, superior utilities provided to the subject site in the after condition is common with pipeline improvements.

In estimating just compensation per State Rule, the following example may be useful.

Value of Whole Property: (5 acres @ \$50/sq. ft.)	\$10,890,000
Value of Part Taken: (1 acre easement @ \$50/sq. ft. x 40%)	\$871,200
Value of the Remainder as Part of the Whole: (10,890,000 less 871,200)	\$10,018,800
Value of the Remainder After the Take (5 acres) (encumbered with 1 acre) @ \$45/sq. ft.)	<u>\$2,801,000</u>
Damages	\$217,800
Benefits	<u>\$100,000</u>
Net Damages	\$117,800
Total Just Compensation	\$989,000

Valuation of a New Pipeline as Part of the Existing Corridor

As described previously, a corridor is a long, narrow strip of land or real property rights for which the highest and best use is to provide an economic benefit by connecting the end points and sometimes serving intermediate points along the way.

There are various methods that an appraiser uses to appraise corridors. The most common include the Across-the-Fence (ATF), Sales Comparison, Cost Approach, Net Liquidation Value and Going-Concern Value.

Since comparable sales of corridors are seldom available, the most common method is the ATF methodology, which is first found in the Interstate Commerce Commission (ICC) manual entitled "Instructions Pertaining To Land Appraisals" dated April 1, 1918.

The five steps to using the ATF method are as follows:

1. Define the value zone of the corridor based on zoning and uses of adjacent property
2. Search for comparable land sales for each of the value zones

3. Estimate the ATF unit value of each zone without considering the size, shape, access and terrain of the subject corridor

4. Multiply the area of the transportation corridor in each value zone by the ATF unit value

5. Add the ATF value for each value zone together to equal the total ATF value of the transportation corridor.

Standard Width for Pipeline Easement

As part of the appraisal process, I often include surveys of private companies and public agencies. The information I recently obtained from one survey is as follows:

Survey of Non-Exclusive Pipeline Easements

	Width of Easement Required	% of Fee Typically Paid
Gas Company	20 foot	25% - 50%
Transportation Agency	10 foot	25% - 50%
Railroad Company	10-12 foot	100%
Pipeline Company	5 foot	50% (30% for 10-foot)
County Sewer District	10 foot	25%

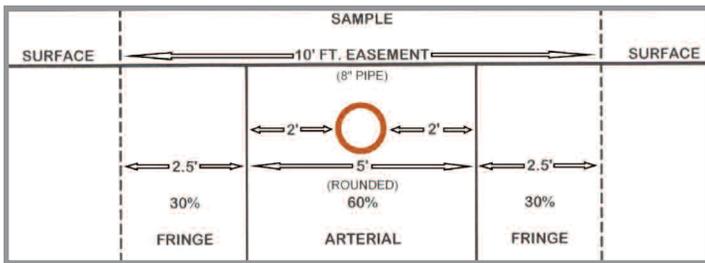
This survey shows that there is no acceptable standard width for a pipeline easement, as it is usually determined through negotiations. Still, it may be helpful to understand the railroad's thought process in setting their standard 10-foot wide widths for pipeline easements.

Initially, railroads arrived at the easement width by rounding up the diameter of the pipe to the nearest foot. Then they added two feet on both sides as a buffer to ensure the pipeline's integrity and security, knowing that no other pipeline company would be interested in placing their pipeline less than two feet from the existing one. As such, the total width of the pipeline, assuming a one-foot or less diameter pipeline, would be five feet (1 foot pipe + 2 feet on both sides = 5 feet).

Since then, the railroads have realized that pipeline users have been getting free access onto their corridors to service and maintain their pipelines. The railroads reasoned that since automobile lanes on public roads are typically 11 to 12-feet wide, and given the width of a standard truck, a 10 to 12-foot width requirement to access the pipeline would seem reasonable. It is also reasonable to assume that the additional width of the easement dedicated solely for access use only should be charged at a lower rate. I call these areas the "arterial zone" and the "fringe zone."

The arterial area is that area known as the buffer zone, whereas no other pipelines or occupancy will be permitted (i.e., 2 feet from both sides of the 8-inch pipeline = 5-foot wide arterial (rounded)).

The fringe area is that area of the easement located outside the arterial area and is less impacted by the pipeline. When alternative means of access for maintenance is available, a fringe area may not be required (i.e., 2.5 feet on both sides of the arterial (2.5 + 2.5 = 5 feet of fringe area)).



However, what happens when the real property for the pipeline runs along the public access road, where users of the pipeline can maintain the pipeline by utilizing the public roadway, rather than the railroad right of way? In this circumstance, the pipeline user will likely not be utilizing the corridor for access to the pipeline. Therefore, under these circumstances, consideration will be paid for the arterial area only.

Upon calculating the diminution of the percentage fee within an existing transportation corridor to the pipeline easement, and assuming that the encumbrance of the arterial impacts the fee rights by 60%, and the fringe impacts the fee rights by 30%, it is calculated as follows:

Arterial:	5' / 10' x 60%	30%
Fringe:	5' / 10' x 30%	15%
Total percentage of fee encumbered		45%

Final Estimate of ATF Value

Assuming the ATF unit value for the subject corridor is \$50 per square foot, and the pipeline encumbrance is 45% of the fee, and the easement area equals 10-foot wide and 100-foot long (totaling 1,000 square feet), the market value of the proposed pipeline easement is as follows:

1,000 sq. ft. x \$50/sq. ft. x 45% = \$22,500

Fair Market Rent

Having determined the market value of the proposed pipeline easement, there are only a few more steps required for estimating the fair market rent for a lease or license agreement. First, determining the market land rate is necessary. This market land rate is best extracted from the market using comparable sales. Given the confidential nature of this information, these land rates for pipelines and transportation corridors may not be available (and we would not use land rates that are incompatible in the highest and best use of the pipeline). So we may have to resort to surveying private companies and agencies.

Through some recent research, I found the following information:

Sample Land Rates Survey

Public Transportation Authority	8% - 10%
Railroad Company	13% (including property taxes)
Pipeline Company	10% - 12%
County Sewer District	8% - 10%

Through an in-depth analysis, an appraiser might arrive at a 10% land rate as reasonable. Using the before-mentioned assumptions, the fair market rent for the pipeline is as follows:

\$22,500 (market value of pipeline) x 10% (land rate) = \$2,250 (rent annually)

As a side note, a relocation clause in a contract typically allows the landowner to require the pipeline owner to relocate the line at any time and for any reason at the cost of the pipeline owner. This typically has no impact on the value of the pipeline. After interviewing numerous railroad, utility, and private pipeline companies, owners of corridors and underlying fee owners of pipelines, I found that they seldom exercise this right.

Another important note is that severance damages are seldom found for new pipelines in transportation corridors because owners of corridors do not let pipeline companies install their pipeline if it could diminish the value of the remaining portion of the corridor. Even in eminent domain, it is beneficial for both parties to work together to minimize damages.

Conclusion

Advance research and preparation is the best way to ensure that the appraisal is supportive and reliable. This entails adequate attention up front, including identifying partial interests, language in the easement agreement, conducting an in-depth search for the best comparable data available and a thorough analysis. On the contrary, if the scope of the assignment is not well defined and/or not followed properly, the analysis and conclusions will be misleading and unreliable. ●

ABC's of Real Estate Terminology for Appraising Pipelines

The following definitions are found in the Dictionary of Real Estate Appraisal, 4th edition:

Across-the Fence Method. A land valuation method typically used to estimate the value of real estate corridor, including railroad or pipeline rights-of-way, highways, or other corridor real estate. The price or value of land adjacent to the corridor ("across-the-fence") is considered for the valuation. Other considerations include Corridor Factor and Usage Factor adjustments.

Adjustments.

- a. Mathematical changes made to basic data to facilitate comparison or understanding. When dollar adjustments are used, individual differences between comparables and the subject property are expressed in terms of plus or minus dollar amounts; with percentage adjustments, individual differences are reflected in plus or minus percentage differentials.
- b. Items that should be prorated or apportioned between the purchaser and seller in real estate transactions; e.g., taxes, rents, fuel.

Air Rights. The right to undisturbed use and control of designated air space above a specified land area within stated elevations. Such rights may be acquired to construct a building above the land or building of another, or to protect the light and air of an existing or proposed structure of an adjoining lot.

Approaches to Value. Systematic procedures used to derive value indications in real property appraisal.

Bundle of Rights. The concept that compares property ownership to a bundle of sticks, with each stick representing a distinct and separate right of the property owner, e.g. the right to use real estate, to sell it, to lease it, to give it away, or to choose to exercise all or none of these rights.

Comparables. A shortened term for similar property sales, rentals, or operating expenses used for comparison in the valuation process.

Conformity. The appraisal principal that real property values created and sustained when the characteristics of a property conform to the demands of its market.

Cost Approach. A set of procedures through which a value indication is derived from the fee simple interest in a property by estimating the current cost to construct a reproduction of (or replacement for) the existing structure, including entrepreneurial incentive, deducting depreciation for the total cost, and adding the estimated land value. Adjustments may then be made to the indicated fee simple value of the subject property to reflect the value of the property interest being appraised.

Cost to Cure. The cost to restore an item of deferred maintenance to new or reasonably new condition.

Double Counting.

- a. In the process of estimating depreciation, accounting for a form of depreciation more than once in the calculations of double depreciation, and thereby over-estimating the impact of depreciation on real property value;
- b. In the sales comparison approach, failing to separate the influence of elements of comparison, and thereby making adjustments twice for the same influence.

Final Value Opinion. The range of values or single dollar figure derived from the reconciliation of value indications and stated in the appraisal report.

Functional Utility. The ability of a property or building to be useful and to perform the function for which it is intended, according to current market taste and standards; the efficiency of a building's use in terms of architectural style, design and layout, traffic patterns, and the size and type of rooms.

Going-Concern Value. Includes tangible and intangible elements of value in a business enterprise, resulting from factors such as having a trained workforce, an operational plant, and the necessary licenses, systems, and procedures in place.

Highest and Best Use. The reasonably probably and legal use of vacant land or an improved property, which is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity.

Larger Parcel. In condemnation, the tract or tracts of land that are under the beneficial control of a single individual or entity and have the same, or an integrated, highest and best use. Elements for consideration by the appraiser making determination in this regard are contiguity, or proximity, as it bears on the highest and best use of the property, unity of ownership, and unity of highest and best use.

Lease. A written contract in which the rights to use and occupy land or structures are transferred by the owner to another for a specified period of time in turn for a specified rent.

License. For real property, a personal, un-assignable, and typically revocable privilege or permit to perform some activity on the land of another without obtaining an interest in the property.

Liquidation Premise. One of the premises under which the total assets of a business (TAB) can be valued; the assumption that a company will cease operations. Under the liquidation premise, assets are valued as if sold piecemeal.

Paired Data Analysis. A quantitative technique used to identify and measure adjustments to the sale prices or rents of comparable properties; to apply this technique, sales or rental data of nearly identical properties are analyzed to isolate a single characteristic's effect on value or rent.

Partial Interest. Divided or undivided rights in real estate that represent less than the whole.

Pipeline Easement. The right to construct, operate, and maintain a pipeline over the lands of others within prescribed geographical limits. The language of the easement determines the extent of the rights granted.

Sales Comparison Approach. A set of procedures in which a value indication is derived by comparing the property being appraised to similar properties that have been sold recently, then applying appropriate units of comparison and making adjustments to the sale prices of the comparables based on the elements of comparison. The sales comparison approach may be used to value improved properties, vacant land, or land being considered as though vacant; it is the most common and preferred method of land valuation when an adequate supply of comparable sales is available.

Scope of Work. The amount and type of information researched and the analysis applied to an assignment. The scope of work includes, but is not limited to, the following:

- The degree to which the property is inspected or identified;
- The extent of research into physical or economic factors that could affect the property;
- The extent of data researched; and
- The type and extent of analysis applied to arrive at opinions or conclusions.

Severance Damages. Generally used to mean those damages to a remainder property that are compensable.

State Rule. In condemnation, the process of determining just compensation by estimating the value of the portion to be acquired as part of the whole property plus the net severance damages.

Sub-surface Rights. (1) The rights to the use and profits of the underground portion of a designated property; usually refers to the right to extract coal, minerals, oil, gas, or other hydrocarbon substances, as designated in the grant; may include a right-of-way over designated portions of the surface. (2) The right to construct and maintain tunnels, subways, sub-cellars, pipelines, and sewers, etc.

Surface Easement. The right to use the surface of land only, e.g., for access, flowage, right of way; also called Surface Rights.

Taking.

- a. The acquisition of a parcel of land through condemnation.
- b. In land use law, application of police power restrictions to a parcel of land that is so restricted as to preclude any reasonable use.

Title. The combination of all elements that constitute proof of ownership.

Transportation Corridor. A long, narrow strip of land or real property rights for which the highest and best use is to provide an economic benefit by connecting the end points, and sometimes serving intermediate points along the way. Most corridors provide these connections for energy (oil and gas pipelines, electrical power transmission lines), transportation (road, rail, aqueducts, channels, navigation, aircraft over-flight), or communications (fiber-optic lines) purposes. Many corridors may or may not have a highest and best use of continued corridor use.

Vertical Division. The division of real property into air, ground (surface), and subterranean rights.

Is That a **Right of Way**



or an Easement . . .

And Does It Really Matter?

I have always been a little confused about what makes a right of way a right of way and what makes an easement an easement. Just what is the difference? In conversations with my peers, I have discovered that others also are a little hazy on the distinction. For example:

Many times I have heard the term “right of way” used as if it defined a specific type of interest. As in, “is it a right of way or an easement?” ... Lumped together within the term “right of way” are a multitude of interests ranging from a limited and revocable permit to fee title.” (Bennett)

The terms do seem to mean different things to different people.

The purpose of this article is to document my findings and draw some observations from a limited research effort on the subject. Let’s start with some definitions straight from *Black’s Law Dictionary*:

Right of way: Term “right of way” sometimes is used to describe a right belonging to a party to pass over land of another, but it is also used to describe that strip of land upon which railroad companies construct their road bed, and, when so used, the term refers to the land itself, not the right of passage over it.

Easement: A right of use over the property of another.

Webster’s confuses the issue by defining an easement as “a right, *as a right of way*, afforded a person to make limited use of another’s real property.” (Emphasis added)

Burby defines an easement “as a non-possessory interest in the land of another.” (Bruce and Ely)

In his *Real Estate Dictionary*, John Talamo offers the following definitions:

Easement: A right created by grant, reservation, agreement, prescription, or necessary implication, which one has in the land of another.

Right of way: A strip of land, which is used as a roadbed, either for a street or railway. *The land is set aside as an easement or in fee, either by agreement or condemnation.* (Emphasis added)

So, from these definitions we could reasonably conclude that what is sometimes called a right of way might also be called an easement and vice versa. However, a right of way, may, in some cases, be a possessory or fee interest. This is an important distinction because “fee owners receive substantive and procedural rights unavailable to easement holders ... Furthermore, easements may be lost by abandonment, whereas fees cannot be terminated in that way.” (Bruce and Ely)

Professor C.A. Fox offers the following opinion about abandonment:

... The general rule is that the holder of an easement may abandon it by an unequivocal act [which] show[s] the owner's intent to relinquish all dominion and control over the property interest. However, the owner [of] a freehold estate in the land, whether fee simple, fee simple determinable, or fee simple subject to condition subsequent (and right of entry in the grantor) can not abandon its property interest. The owner of a fee can only relieve itself of the rights and obligations of ownership by transferring the fee to someone else.

Thus, the fee/easement distinction is important to the servient estate owner, the “right of way” owner, adjacent landowners, as well as third parties that may need to obtain some interest in the land.

Bruce and Ely point out that the problem arises when the parties do not accurately explain the nature of the interest intended. The intent of the par-

ties controls, so when there is ambiguity the courts must decide what the intent was. “Generally, the courts conclude that a conveyance of a ‘right of way’ creates only an easement whether the grantee is an individual, a railroad, or another entity.” That position has been affirmed by a Missouri appellate court:

Use of terms such as “right of way,” “road,” or “roadway” as a limitation on the use of land is a strong, almost conclusive, indication that the interest conveyed is an easement. This doctrine arises from recognition that from a practical standpoint long narrow strips of land serve little or no function other than for road or rights of way. Therefore, unless the parties make it clear that a fee is intended, it is presumed that they did not intend to create an otherwise unusable interest in land. (Bruce and Ely)

Bruce and Ely also mention that the courts often struggle with the interpretation of contradictory language in the instrument of conveyance. “Neither the form of the instrument nor its label dictates the nature of the interest created. Such matters are only evidence of intent.” In other words, the name of the document may be some evidence of what the parties intended, but the name, in itself, does not necessarily prescribe the nature of the interest that is granted.

A good example of a document that has resulted in different interpretations of its effect is the “Quitclaim Deed” which was issued by the federal government to the state of Alaska under the Alaska Omnibus Act of 1959. The deed purported to convey “all rights, title and interest in the real properties owned and administered by the Department of Commerce in connection with activities of the Bureau of Public Roads.” (Bennett)

Did the state receive a fee interest or an easement interest? For several years there were differing opinions on this issue. In February 1993 an Attorney General's opinion (which overruled a 1985 opinion) was issued concluding that “Under the Alaska Omnibus Act and resulting Quitclaim Deed, the state

of Alaska received, in general, easements for its roads at statehood.” (Bennett)

An area of particular controversy in many states is the intent of rights of way for railroad purposes. Since many railroads have failed or reduced operations, the issue of whom owns abandoned tracks and other property frequently leads to litigation. The conversion of out of service tracks to bike and pedestrian trails under the National Trails System Act of 1983 (Public Law 98-11) has resulted in many court battles.

Section 1247(d) of the National Trails System Act put a new spin on the abandonment of railroad rights of way by providing:

... In the case of interim use of any established railroad rights-of-way pursuant to donation, transfer, lease, sale, or otherwise in a manner consistent with this chapter, if such interim use is subject to restoration or reconstruction for railroad purposes, such interim use shall not be treated, for purposes of any law or rule of law, as an abandonment of the use of such rights-of-way for railroad purposes. If a state, political subdivision, or qualified private organization is prepared to assume full responsibility for management of such rights-of-way and for any legal liability arising out of such transfer or use, and for the payment of any and all taxes that may be levied or assessed against such rights-of-way, then the Board shall impose such terms and conditions as a requirement of any transfer or conveyance for interim use in a manner consistent with this chapter, and shall not permit abandonment or discontinuance inconsistent or disruptive of such use.

The effect of the above statute was to “allow the Interstate Commerce Commission, under certain conditions, to ‘bank’ railroad rights-of-way when a railroad wishes to halt operations on the line, rather than permitting the railroad to ‘abandon’ the right-of-way.” (Fox)

The law was challenged by property owners in Vermont whose land contained a now unused railroad right-of-way that

was proposed for conversion to a public trail. "Their argument was that, under state law, the right of way could exist only as long as it was used for railroad purposes. Once that use ceased, the right of way ended and the possession and ownership of the easement area reverted to the owner of the land over which the right of way extended." (Fox)

The case went all the way to the U.S. Supreme Court. The Court held that the "rails-to-trails" law is constitutional, but ruled the claimants should take their "takings" claim to the U.S. Court of Claims, *Preseault v. ICC*. The Court of Claims rejected the "takings" claim, but in November 1996, on appeal, the U.S. Court of Appeals ruled that the reversionary property owner would get just compensation from the federal government for a rails-to-trails conversion. (Welsh)

Richard Welsh, Executive Director of the National Association of Reversion Property Owners (NARPO) contends that:

Most users of ROWs (railroads and utilities) do not own the underlying land that the right of way is on; they only have an easement for a specific purpose. When this specific purpose is extinguished (railroad abandoned, road closed, utility moved to another location, sewer line not now needed), the land reverts back to the then existing abutting or adjacent property owner free of encumbrance or easement.

NARPO reports that there are over 500 federal and state court decisions on the abandonment of different type of rights of way. (Welsh)

Bruce and Ely offer the following analysis of rights of ways for railroads:

The railroad purpose cases ... present more complicated problems of interpretation because, in many of them, land for railroad stations, depots, roundhouses, and office buildings was included in the transaction. These cases naturally involve a variety of documents worded in various ways. Some of these documents speak of both a right of way and use for railroad purposes only. If the purpose limitation is included in the

granting clause, the courts tend to find an easement, if not, a fee is favored. Thus, a slight difference in the location of terminology is often largely responsible for the results reached by courts attempting to ascertain the intention of parties.

Concerning the interpretation of ambiguous grants of interests, in his course material for IRWA Course 802, *Legal Aspects of Easement*, Daniel Beardsley makes the following distinctions:

- The more specifically defined and the narrower the purpose of the interest created, courts will generally rule the interest is an easement rather than a fee simple.

- Where the interest is not narrowly defined courts are more likely to find the interest conveyed is a fee simple.

A document may be called a "deed of right of way" (or some other equally confusing title). A deed is generally an instrument that is used to pass fee title. But the name of the document is not controlling. A deed of right of way may be nothing more than an easement. Regardless of what it is called, the courts are going to look at the characteristics of the document. The controlling factor is the intent of the parties at the time of the transaction.

In summary, the definitions we ascribe to the terms "right of way" and "easement" are not too important. The terms have, in many cases, been used interchangeably. In determining whether the instrument is a fee transfer "right of way" with possessory interests or an "easement" with non-possessory interests, the important thing is what the document says. What was the intent of the parties? The courts appear to be reluctant to rule that a right of way is a fee interest unless there is clear intent.

Doesn't it make sense to draft documents so that the label and the granting clause are consistent? We can't undo what has already been done, but we can take positive steps to avoid future problems caused by contradicting language in documents. If a possessory interest is to be transferred, let's call it a deed and use the appropriate language for a deed. If

a non-possessory interest is to be transferred, let's call it an easement and use the appropriate language for an easement. Finally, I think that we should move away from the idea that a right of way may represent either a possessory or non-possessory interest. A right of way should be thought of as class of easement. If a fee interest is to be conveyed, a deed, with the appropriate granting language, should be used. ■

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Appraisals of Pipeline Right of Way

by Carr T. Dowell, III

Carr T. Dowell, III, is a real estate appraiser and consultant associated with Max J. Derbes, Inc. in New Orleans, Louisiana. He received his L. L. B. from Louisiana State University and is a member of the Louisiana Bar Association. He has over 20 years experience as an appraiser, expert witness, and consultant in right of way appraisals. He is currently Chairman of Region 2 and is a member of the International Nominations and Special Awards Committee. He is a past Chairman of the International Right of Valuation Committee. This paper was first given at the 26th Annual Region 2 Seminar held August 1983.

There are different approaches for appraising pipeline rights of way. The problem for appraisers is that pipeline rights of way are not normal market transactions in keeping with normal land utilization.

In this paper, the appraisal of pipeline right of ways will be discussed, with particular emphasis on the rules and laws of Louisiana.

It should be noted that many appraisal problems are imposed by legislative bodies and courts and can also vary substantially from area to area. It has been our experience that pipeline right of ways tend to cost more in Louisiana. The absence of a "quick taking" statute, together with the generous nature of our judiciary may be responsible. It is also possible that pipeline appraisals in Louisiana are more of a problem.

I will not delve into procedures for making an appraisal per se, but, will be limited to the particular requirements of pipeline right of way appraisals.

Pipeline right of ways are typically negotiated on the basis of so much

per rod without benefit of formal appraisals. The resulting consideration paid usually has only limited relationship to the market value of the property rights acquired, but, rather relate to the going price per rod paid in the vicinity for such rights and upon the urgency of prompt acquisition of the right of way. The price paid can of course be greatly influenced by whether or not the pipeline company has the right to acquire the property by eminent domain.

It has been seriously argued that the per rod prices paid for right of way should be utilized in estimating the market value of pipeline right of ways. This approach has been rejected in most jurisdictions with limited exception. In the Federal Courts it has been held that such transactions should only be used where there are no other land sales in the area upon which to

make a before and after appraisal. At the same time it is my understanding that the Bureau of Land Management is advocating this procedure in the appraisal right of ways across lands under their jurisdiction. This is particularly interesting in light of the fact that the U.S. Department of Justice has vigorously and successfully opposed this appraisal procedure in a pipeline case emanating in Texas. It is our belief that such acquisitions do not meet the test of "market value" because they involve neither the "willing seller and willing buyer" nor the "under pressure" concepts. Further the price paid per rod for identical takings on the same project may and often do vary substantially. For these reasons we will not go any farther into the price per rod appraisal approach here.

If the right of way appraised em-

braced the entire property and the taking was in fee, then the appraisal process would be the same as that for any similar property. Such a taking, while unusual, would clearly indicate why the per rod prices paid in the area are not market, but such an appraisal would not require the special expertise which a right of way appraiser needs. The primary problem facing the appraiser is that pipeline right of ways are not normal market transactions in keeping with normal land utilization. They are typically narrow strips bisecting a property and which limit or restrict the future use of it, but, do not take all of the bundle of rights which make up the value of the property. The surface of the land may still be used for growing crops, grazing livestock, lawns, parking, and similar uses, but, you are not allowed to erect buildings on it or use it in any manner which might jeopardize the underlying pipeline. In addition, the right of way may affect the future use or utility of the real estate outside of the actual right of way area.

The basic method of estimating the value of the right of way will vary depending on the legal jurisdiction in which you are appraising. If you are appraising under the "Federal Rule", then the proper procedure is to estimate the market value of the whole property before the taking, then estimate the value after the taking with the difference between the two being the measure of compensation to the property owner. Theoretically, it is possible under this procedure to have near zero just compensation. If for example, the right of way crosses a tract of grazing land that has no potential of ever having a higher type use and the surface of the land is to be restored to its identical condition after the pipeland is laid as it was before, then, in all probability, the property would sell for the same price after the taking as before. The only compensation due in this case would be for the brief period which the surface was being used for construction.

In a majority of jurisdictions you are required to pay just compensation for the part taken together with damages, if any, to the remainder. The procedure in this case is to first appraise the whole property, second the part taken, third the remainder, and fourth the

value of the remainder is subtracted from the before value, less the value of the part taken, to determine if any damages to the remainder will result from the taking.

The proper way to appraise any pipeline right of way is to estimate the value of the whole property in the same manner as you would normally appraise the property. Unless specifically required to do so or unless there is a possibility that improvements outside will be affected, it is usually not necessary to appraise the unaffected improvements. In estimating the market value of the part taken other than by a pure before and after approach, there are at least three possible approaches depending once again on legal jurisdiction.

The first approach would be to estimate the value of the part taken using the average unit price of the whole tract, i.e., if a 100 acre tract has

Typically, pipeline rights of way limit the future use of a strip of property, but do not take all the bundle of rights.

an estimated market value of \$100,000 or \$1,000 per acre, then the land in a 5 acre right of way would have a contributory value of \$5,000. This would not be the value of the part taken, since, in all probability the right of way area would still have some use or value to the owner after imposition of the servitude.

The second approach is where the laws of the jurisdiction require that the taking be appraised on the basis of its contributory value to the whole. This approach has been termed "front land-rear land" premise in some areas. An example of this would be where the same 100 acre tract fronts on a major road and the highest and best use of the front 20 acres would be to develop for residential homesites and the 20 acres would sell for \$3,000 per acre or \$60,000, leaving the rear 80 acres having a contributory value of \$40,000 or \$500 per acre. If the 5 acre right of way is taken from the front land then the market value of the area within the right of way is \$3,000

per acre or if taken from the rear \$500 per acre.

The third approach would be to appraise the 5 acre right of way areas as a 5 acre tract. Using the same 100 acre example, if the highest and best use of the front 20 acres is to sell off 4 five acre tracts as rural homesites and such homesites would sell for \$5,000 per acre, then the value of the land in the 5 acre servitude would be \$5,000 per acre.

Once you have estimated the value of the land within the right of way limits, the next step is to estimate the value of the rights taken. The most acceptable approach, theoretically, is by analysis of sales of similar properties with and without pipelines to determine the difference in the market value of such whole tracts. There are two primary limiting factors which must be thoroughly analyzed in order to use this procedure. First there must be no possible damages to the property outside of the pipeline right of way and second the similarities between the tracts with and without pipelines must be sufficient so as to leave no doubt that any differential in price is due to the presence of a pipeline right of way. A simple example of this would be where there are a series of 10 ten acre tracts measuring 660' x 660', and fronting on the same road and all being identical except that 3 have pipeline easements across the extreme rear embracing .25 acre. If the seven unencumbered lots sold for \$10,000 each and the 3 lots with pipeline right of ways sold for \$9,875 each, it would be reasonable to assume that the difference in price is the result of the pipeline across the three that sold for less. The unit value of the unencumbered land is \$1,000 per acre and it follows that the front 9.75 acres of the unencumbered tracts is also \$1,000 per acre or a total of \$9,750. This leaves \$125 as the contributory value of the .25 acre area in the easement. If there were no easement, this land would be worth \$250, therefore, it can be reasonably concluded that the taking for the pipeline was 50% of the value of the land within the easement area. If the land you are appraising is similar and has the same highest and best use, then this comparison would be a reasonable indicator of the market value of the rights taken.

Unfortunately, seldom do such clear



A pipeline right of way crosses a tract of tidal marsh. The highest and best use of the land is to hold for potential oil and gas development. Disregarding environmental considerations, the value of the right of way would approach 0%.

cut comparisons exist in the market and frequently, reasonable comparisons do not exist at all. Under these circumstances, the appraiser must rely on an analysis of the highest and best use of the property, both currently and in the future. Here are examples of such analysis:

1. A pipeline right of way crosses a timber tract that has recently been clear cut. The highest and best use of the land currently and in the foreseeable future is for growing timber. Under these factual conditions, the value of the pipeline right of way would approach 100% of the value of the land since it could not longer be used to grow timber.

2. A pipeline right of way crosses a tract of tidal marsh. The highest and best use of the land is to hold for potential oil and gas development, and hunting and trapping leases. This will

remain the highest and best use in the foreseeable future. Disregarding any environmental considerations, the value of the pipeline right of way would approach 0%. It has, however, been the practice of many appraisers to estimate the value of right of way at 50% of fee on the basis of joint utilization of the land.

In between these extremes are various degrees of takings; such as a taking from a commercial tract where the taking area can still be used for necessary parking areas or a taking from a residential lot where you can still build a house on the remaining land and use the right of way for lawn. Care must be taken not to confuse the value of the part taken with damages to the remaining property.

In none of the above illustrations did we discuss anything in the taking area other than the land. Obviously, if

there are crops, timber, or improvements in the taking area, you must compensate the owner for these items.

The next consideration is damages which may be caused by the pipeline. Damages as used therein refers to any diminution in the value of the property outside the pipeline right of way that might be caused by the easement. It does not refer to the possible reduction in value of the right of way itself, nor does it refer to damages caused by disruption of soils, loss of crops, or improper construction of the line.

Some of the real or imaginary damages which have been attributed to pipeline right of ways include: loss of value due to severance of one part of a property from another, loss of utility of remainders, fear of explosion, and cost of casing to provide future road crossings.

Once again, the best method of estimating damages to remainders is by comparison of sales of similar properties with and without pipelines. Another method is to study the effect of the easement on the utility of the remainders.

The use of comparable sales to estimate damages, if any, to the remainder has been used many times. The following are examples of the use of this appraisal procedure.

1. In conjunction with a pipeline right of way project through a metropolitan area, studies were made of a series of sales within subdivisions in the area. Both vacant lot and improved lot sales were studied. The sales of properties without pipeline influence were compared with sales of properties with multiple pipelines running across or abutting the rear of lots. Not only were comparisons made to determine if the pipelines affected sales price but also to determine if they took longer to sell. Sales of properties in commercial areas were also studied. Not only were the sales price of the lots abutting or traversed by the pipelines compared, but, also the land utilization was studied.

2. In a rural but developing area, sales of tracts with the potential for development of small acreage lots were studied and comparison of the sales prices of tracts with and without pipeline right of ways were made.

3. In an industrial park where there were large lots, sales of lots with and

without pipeline easements were compared to determine the effect on the land utilization and the market value of the lots with and without pipelines.

4. In another study, sales of large suburban lots in a residential subdivision that was bisected by several pipelines were analyzed to estimate the effect of the pipelines on the market value of the lots. The placement of residences on affected lots was also studied.

All of these studies tended to show that there was little or no resistance in the market to the purchase of lots as a result of fear of a future catastrophe.

There remains the question of damages due to the effect on the future utilization of the property because of the location of the right of way. A simple example of this would be where there is an 80' wide residential lot with 10' sideline setback restrictions and a 30' right of way down the middle of the lot. Obviously this lot can no longer be utilized as a building site and in all probability has been severely damaged.

If this same pipeline crosses the extreme rear of the lot, little or no

utility has been lost and there will probably be no damages to the remainder.

A less certain situation would be where the pipeline cuts diagonally across the rear 1/2 of the lot and would require that any residence that was placed on the lot would have to be designed to conform to the configuration of the unencumbered land. The utility of this lot has been affected. The problem here is to measure the effect of this loss of utility on the market value of the lot.

A situation which the appraiser is frequently confronted with is where a right of way bisects a tract of land that has a highest and best use for developing as a residential subdivision. In this case the location of the right of way is highly significant in the determination of the effect on the utility of the tract. If the easement runs along the rear of the tract parallel to the rear line, the prospect of adverse effects are obviously much less than if it enters at the northeast corner and cuts diagonally across to the southwest corner. In these cases, it is usually advisable

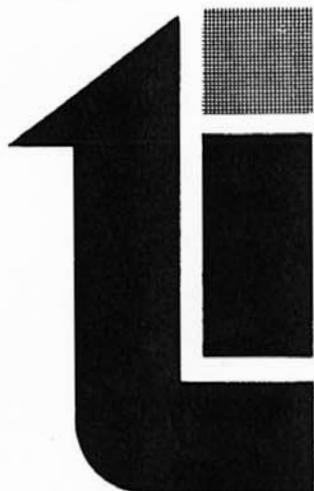
to lay out possible development plans of the land with and without the pipeline. Usually, this will indicate the adverse effect on future development of the land, if any. One factor which may complicate the development after the pipeline is laid is the requirement in some jurisdictions that all road crossings be cased. Obviously, when the pipeline must be cased by a developer his cost of developing the land will be substantially increased. It is often advisable in such cases, where possible, to work around such crossings. Fortunately in an increasing number of jurisdictions the casing of crossings is no longer required.

From the foregoing, it can be seen that it is essential when estimating damages, if any, as a result of a pipeline easement, to study the effect on the future utility of the property. In every case, you must determine the highest and best use of the property before and after the taking. You must be familiar with zoning regulations, land use requirements, subdivision development regulations, and any other factor that might affect potential use of the land. ■

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Appraisal And Uses Of Abandoned Railroad Rights-of-Way

By Arch Blackard, SR/WA

Throughout the history of right-of-way acquisition, appraisers have continually encountered new and complex appraisal problems. All of these have been challenging and invigorating. Now some of us have been fortunate by having had some fairly recent experience in appraising abandoned railroad rights-of-way. Others of us will probably get the opportunity in the not-too-distant future.

The main reason for this is that not all railroads have been operating profitably in the past years. Many have had to declare bankruptcy and many are still losing money on their branch lines and main lines. Because of this unfortunate situation, Congress has recently enacted four laws which aid the railroads and many users of them.

The first was the Regional Rail Reorganization Act of 1973 (The 3R Act). This was enacted to reorganize the operations of the bankrupt northeastern railroads (principally the Penn Central) into Conrail. In addition to the conveyance of property and operation to Conrail, the Act allowed for the continuation of service on lines through State and local purchase or subsidy. Any lines that were not taken over by Conrail or subsidized could be abandoned. It is my understanding that the suit is still pending on the value of the railroads taken over by Conrail.

Second was the Railroad Revitalization and Regulatory Reform Act of 1976 (The 4R Act). This act extended the branchline assistance program to all states as an alternative to abandonment. In essence, it provided subsidies or acquisitions to keep some lines operating if the Interstate Commerce Commission (ICC) ruled an abandonment was justified.

Third was the Local Rail Service Assistance Act of 1978, which establishes eligibility for program assistance to light density lines (less than 5 million gross tons per mile). It provided funds for rehabilitation rather than acquisition.

Fourth is the Staggers Rail Act of 1980. This act requires railroads to sell rail lines under certain circumstances to a finan-

cially responsible applicant, who may be either an individual, a group, or a governmental body. The purpose is to provide shippers and communities with an alternative to inadequate rail service or future abandonment of a line. The act provides that the purchaser must pay the "Constitutional Minimum Value," which is presumed by the statute to be not less than the net liquidation value of such line or the going concern value, whichever is greater. The Interstate Commerce Commission recently invited comments on the methodology to be used in establishing these two values or if the interested parties should be allowed to submit what they feel is adequate data to support their estimate of value. As far as I know, this has not been resolved.

As appraisers, we will probably be more involved with railroads under the 4-R Act. One provision of the Act is for a railroad to make an application to the ICC to abandon a certain line or a segment of a line. Then an ICC hearing is held and all interested parties are permitted to testify either in favor of or in opposition to the abandonment. If a state, local agency or shippers feel the line is needed, they will oppose the abandonment. When this happens, part of their testimony is for the value of the real estate in the right-of-way. The railroad will also present valuation testimony. From our own experience, divergence in the testimony concerning value in such a hearing has been as wide, if not wider, than most testimony you will hear in condemnation cases.

After hearing and weighing the testimony, the ICC will rule on the abandonment. If, as a result of their ruling and possible appeals, the abandonment is allowed, two things then can happen. First, the State, local government or shippers can subsidize the railroad to keep the line in operation. Part of the subsidy is based on the value of the real estate, upon which testimony had been given during the hearing. The ICC determines the value based upon this testimony. Second, if the line is not subsidized, then the line is abandoned

and can be sold on the open market by the railroad. Appraisals are needed for these sales.

There have been several lines abandoned, and it appears that more will be in the future. States, utility companies and possibly railroads have been and will be looking at these abandoned rights-of-way for future transportation, communication, energy and recreational corridors.

Vermont acquired two such lines a few years ago and is leasing them for continued railroad use. I understand they are operating economically now. Illinois is presently subsidizing three segments for a total of about 150 miles.

Wisconsin has probably been the most active of any State in acquiring abandoned rail lines. There is a relatively new statute that gives their Department of Transportation the authority to acquire these rights-of-way for railroad, highway or recreational use. During the past two and one-half years, they have acquired approximately 500 miles (about 20 segments) of abandoned branch line railroads through negotiations and condemnation. Most of this will be utilized for some types of continued railroad use.

With this brief background and look at the future, it appears evident that more abandoned railroad rights-of-way will be available for sale. If so, appraisals will be needed and we, as appraisers, should be prepared to handle the assignments. Here are some of my ideas.

As far as I know, there have not been any new techniques invented for the appraisal of abandoned railroads. Due to the "nature of the beast," however, special attention should be given and emphasis should be placed on three items in the appraisal. These are (1) the type or types of title owned by the railroad, (2) the Highest and Best Use of the property, and (3) the approaches to value to be used. Each of these will be covered in more detail.

Types Of Title Owned By Railroads

There may be some variations, but, basically, railroads obtained the right to use

property three ways. These are (1) by fee simple title (2) by a deed with a reverter, or (3) by an easement.

If the railroad owns fee simple title, the appraiser's task is the easiest of the three. This is the type of title we are normally asked to appraise. The owner owns all of the sticks in the bundle, and he can do whatever he pleases with these sticks. Normally, the whole bundle is sold at one time.

The second way is that the railroad obtained title through a deed with a provision which states title will revert to the grantor when the property ceases to be used for railroad purposes. This sounds simple, but *beware*. There apparently are statutes in some states that waive this reversionary right after the railroad has used the property for a certain length of time.

The third way was to obtain an easement for railroad purposes. This is very similar to the way most right-of-way was acquired in the old days for State highways and local roads. This, too, sounds simple, but who owns title when the railroad use is extinguished? Does the railroad own an easement it can sell or does title automatically revert to either the own-

er of the underlying fee or the owners of the abutting lands? Needless to say, this can also vary from state to state.

During my conversation with Ben J. Mullin, Director of the Bureau of Real Estate for the Wisconsin Department of Transportation, he said that one of their major problems in the acquisitions over the past two and one-half years has been in determining the type of title owned by the railroads. It seems that although the railroads may have thought they had fee title for an entire segment of line, it is not unusual to find a substantial number of parcels on which their title was for railroad use only, and once this ceased, the title apparently reverted to either the owners of the underlying fee or the abutting owners. It seems that in some states, the courts have held that a conveyance which states "for railroad use" means an easement and railroads have no rights in the property after an abandonment.

So what does all this mean to an appraiser or someone interested in buying the property? Simply stated, it means you had better know what you are appraising or buying.

Our experience has been that railroads

have not been overly cooperative in furnishing title information in the past. On most lines they have "Valuation Maps" and these usually have recording data showing how the right-of-way was acquired from the individual properties. This is a good place to start a title search. In all cases, we recommend legal advice and a title commitment or some other evidence of title before the appraiser begins. *You must know what rights you are appraising.*

All of the following are being made on the assumption that the railroad has merchantable fee simple title.

Highest And Best Use

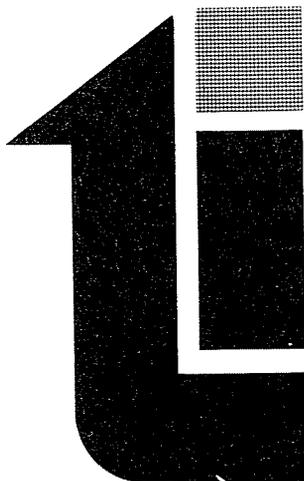
This is normally the most important item in estimating the value of any piece of property. In valuing railroads, I feel it is even more important. Depending solely upon the Highest and Best Use, a segment of line could vary from a very minimal value to thousands of dollars per mile.

This is true because of the many uses to which such right-of-way is being put. Sales we have gathered show numerous uses by the purchasers of the right-of-way. Some lines have sold for a continued corridor use, but most are sold off in small segments.

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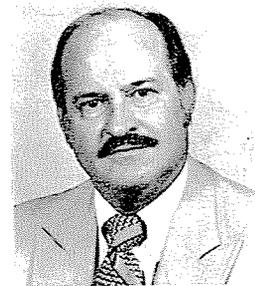
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The vast majority have sold in small parcels to private individuals for use with abutting lands. Some purchases have been solely to keep others off the right-of-way, some have been to link up their property to a highway, some have been so the area can be farmed, some are used for field roads, some connect fields divided by the railroad, some merely to keep someone else from buying it, etc. The reasons behind these purchases apparently can be infinite.

Some of the sales to individuals of small parcels have been for individual sites. We have seen these used for residential, commercial and industrial purposes.

Some parts of the corridors have sold for recreational use. Normally a government body makes such purchase and uses the right-of-way for bike paths, hiking trails, snowmobile trails and equestrian trails. Apparently these have been well accepted in some areas but not in others. We have heard some opposition to such trails because abutting owners are worried about the type of people that will be using them; they think users may get off of the right-of-way and cause destruction on their own property; they think users will throw debris on their property, etc.

Some have sold for a continued corridor use to a utility. These have been for sewer lines, power transmission lines, telephone lines and pipelines. Believe it or not, but some have even sold for a continued railroad use. These are normally for branch lines, spur tracks, sidings and children's train rides.

If the intended use will not be for a railroad, the track and other appurtenances are usually salvaged or sold separately. When the track sells, the price depends mainly upon the weight and quality of the rail.

It is evident that the right-of-way could have various uses. Some type of a continued corridor use normally would bring the highest price, but you must determine if there is a need for such use.

In determining the Highest and Best Use, start by contacting all parties that could have a use for a right-of-way corridor. This includes the utility companies that are authorized to operate in the area, highway agencies, all agencies responsible for providing recreation to the public, private organizations that acquire property for preservation or recreational uses, other railroads and anyone else you can think of. Make these inquiries in writing and ask for replies in writing.

If you have covered all facets, the replies will tell you if there is a need for a corridor use and, if there is a need, what type. If there is no such need, the Highest and Best Use will have to be for sell off as smaller parcels to abutting owners or to individuals wanting sites for residential, commercial or industrial sites.

One word of caution. Title III in the "Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970" states in part . . . "Any decrease or increase in the fair market value of real property prior to the date of valuation caused by the public improvement for which such property is acquired, or by the likelihood that the property would be acquired for such improvement, other than that due to physical deterioration within the reasonable control of the owner, will be disregarded in determining the compensation for the property."

This may be difficult to determine in some cases, but must be disregarded by the appraiser. An example of how this could happen in the appraisal of railroads would be where a highway abuts an abandoned railroad for several miles and it is decided to widen the highway and acquire a few miles of the railroad property as right-of-way. You, as the appraiser, decide that the Highest and Best Use of the railroad right-of-way is not for a corridor use unless it is used in the subject project. If the public improvement was not being made, the railroad right-of-way could have only been sold to abutting owners; therefore, a Highest and Best Use for a highway or a corridor use would have to be disregarded by the appraiser. This would be considered an increase in value caused by the proposed improvement.

The Approach To Use

As you know, the cost, market and income approaches to value are normally considered by the appraiser in valuing any property. The cost approach is a useful tool when the improvements on a property are new. It is also relied on when there are no sales comparable to the subject property, as improved. Abandoned railroads do not fall into either category.

The income approach is useful when the property produces rental income and is the type that investors are interested in. Abandoned railroads normally do not produce income.

The market approach is considered by most of the appraisal profession and the courts to be the most reliable of the three approaches when adequate market data

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is available. In fact, in many jurisdictions, market value and market approach are synonymous except on special purpose properties that do not sell on the open market. Abandoned railroads sell on the open market so how can they be considered special purpose property?

Earlier it was mentioned that there is a case pending on the bankrupt railroads under the 3-R Act of 1973. A Special Court was appointed to hear the case. Although the case has not been finalized, the Court has ruled that it will not permit valuation testimony based on reproduction cost, assemblage value, value of material in place, trended original costs, gross liquidation value or going concern value. The methodology for appraising lines under the Staggers Rail Act of 1980 has not been determined.

All of this has led me to feel that the market approach should always be used. The cost and income approaches would seldom, if ever, be applicable.

The Appraisal

Practically all case law dictates that property should be appraised as a unit. We have all heard of the "Unit Rule" - you value the whole as a unit rather than valuing the parts separately and adding them together to arrive at the value of the whole. Why should it be different with railroads? Unless there is something unusual that would cause the entire length to be divided into two or three segments, the entire right-of-way should be valued as a unit.

As previously mentioned, the abandoned railroad right-of-way could have a Highest and Best Use for either a non-corridor or a corridor use. Let's take a look at these two cases separately.

Non-Corridor Highest And Best Use

The appraiser is confronted with the problem of finding sales. If he is lucky, he will be able to find sales where abandoned railroads have sold off parcels in the subject area or a similar area. If he is not so lucky, he will not be able to find such sales.

Let's look first at where the appraiser is lucky. In comparing any sale to the subject property, certain adjustments must be considered. The same is true in this case. Time and location must always be considered, but some additional items should also be considered. Some of these are: The cost to restore the right-of-way to a usable condition on the sale as compared to the subject; the amount of deep cuts

and fills on the sale as compared to the subject; for farming purposes, will the subject land be as productive after restoration as the sale; and the length of time required to sell off the entire length of right-of-way. All of these, plus any others that may be necessary, must be considered. This should lead you to a realistic estimate of value.

From past experience, we know that it is the exception, rather than the rule, when we are able to find good comparable sales. The same may be true in this case. When this happens, it makes the job of appraising more difficult, but not impossible.

I first suggest that when sales of parcels of abandoned railroads have not occurred in the area that the appraiser go to other areas where such sales have happened. In these areas, he should get the railroad sales and compare them to sales of other properties that have sold in the areas to determine the ratio of the unit selling price of the railroad sales to other properties. The ratio can then be applied to sales of property in the area of the subject railroad.

An example would be where it was found that railroad sales sold for approximately 50 percent as much as other property in the area. This 50 percent could then be used as the basis of an adjustment to sales of property in the area of the subject railroad. After this is done, the appraiser should still consider the other possible adjustments previously mentioned when sales of railroad right-of-way are used.

There is another method that may be used by an appraiser if he cannot find any sales of railroad right-of-way that have sold in small parcels. In this manner, you start with the value of abutting land and adjust for such things as cost to restore the right-of-way so it will be usable, the percentage that may be unusable because of deep cuts or high fills, the productivity after restoration, the sell off period, etc. Although this may be acceptable, I feel it should only be used as a last resort.

I would like to elaborate on the "Sell Off" period that the appraiser should consider. Two states have made studies on this. Some of the interesting facts of the

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studies are: Occasionally an entire line will sell to a speculator who then tries to sell to abutting owners; after several years, there have been no sales off of some lines; and on most lines, a percent of the right-of-way has sold after a few years, but the entire line has not sold.

This indicates that it takes time to sell abandoned right-of-way to individuals as separate parcels. It seems logical that the longer a line, the longer it will take to sell off all of the parcels. Keep in mind also that all of it may not ever sell. The railroad may be stuck with it. Fellow appraisers, this affects the present value of a property and must be considered by the appraiser.

To sum up my suggestions when the Highest and Best Use is not for a corridor, first look for railroad sales in the area. If none are available, go to other areas where there have been some and compare them to sales of other property in the area. As a last resort, use sales of other property in the area. Make the adjust-

ments necessary to arrive at a realistic estimated value of the subject property.

Corridor Highest And Best Use

The first step after determining that the Highest and Best Use was for a specific corridor type use is to find sales that have sold for this use. There are sales available if you look hard enough for them. We have found that other agencies, appraisers, utilities, etc. are very cooperative in exchanging sales data. It takes some time, but it can be done.

Next, you must know what is to be included in the appraisal of the subject. Does it include track, buildings, signals and other appurtenances?

After you have the sales and know what is to be included, you proceed with the market approach the same as for any property. I feel that the cost per mile is best unit of comparison to use for this type of property. You must consider such things as time, location, length, condition of bridges, condition of tunnels, and, if ap-

plicable, condition of rails, ties, ballast, buildings, etc. If you apply sound reasoning, your estimate of value will be realistic.

Summary

The appraisal of abandoned railroad rights-of-way may be relatively new, but no new gimmicks are needed by the appraiser. He must, however, be more concerned with the rights being appraised and the Highest and Best Use of the property than may be normal. It may also take more time to gather good market data, but it is available. An abandoned railroad right-of-way is a unit and should be appraised as such. You must consider what it will bring *today* on the market for its Highest and Best Use.

This may sound very simple, but it is not intended that way because it will take considerable time and effort. The main thing is that the appraiser must apply good old common sense to his data to arrive at an estimate of value. This is not a new ball game. It is simply a different kind of property that we may be asked to appraise.

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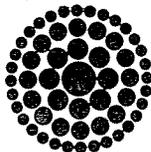
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TURNING ON THE FUTURE FOR YOU

Appraisal:

May the Best Approach Win

BY ARTHUR G. RAHN, SR/WA, ASA

The Across the Fence (ATF) methodology has been in use for almost 100 years and has been the principal method of valuation in thousands of corridor transactions. And yet, there are still questions being raised about its efficacy. The March/April 2007 issue of *Right of Way* magazine carries a third article by John Schmick entitled, "Appraising Public Utility Easements in a Railroad Corridor" in which he responds to my review of his two previous articles.

As was pointed out, there is much common ground with which we both agree, but there are major differences in certain areas which I feel go to the very heart of the methodology. For example, there seems to be basic misunderstanding of how ATF values are derived. The corridor is divided into segments or districts which are compatible with adjacent land uses. An ATF value is assigned to that portion of the corridor based on the value of a typical parcel of adjacent land. The idea is that if the corridor was not there, the land comprising the corridor would be part of the adjacent lands and have their same value. There is no synergism involved here. This is straight market economics. When these zones are joined together into one parcel - the corridor - then a synergism is created to recognize the greater utility of the combined parcels. This synergism, called an enhancement factor, railroad factor or corridor factor, is not made up from whole cloth. It is determined by analyzing how other corridor sales were completed. Again, straight market economics. How this can be construed as a violation of Uniform Standards of Professional Appraisal Practice (USPAP) completely escapes me.

Last week I was reviewing some historical data about the Interstate Commerce Commission (ICC) in general and the Bureau of Valuation in particular. This Bureau was established in 1916 as the successor to the Division of Valuation and assumed the primary responsibility for preparing inventories of fixed physical properties and assets of domestic railway carriers in support of the ICC's work authorized by acts of Congress. The Land Section of the Bureau has records which contain the field notes of the ICC appraisers relating to the (then) current value of real estate adjacent to railroads between 1915 and 1928, arranged alphabetically by the name of the railroad company. These notes each pertain to a land appraisal

zone established at each point where property adjacent to the railroad changed in value. The process used back then is the same process used today.

Mr. Schmick's article goes on to demonstrate how the application of occupancy factors for longitudinal easements can lead to a corridor owner being able to sell more than he owns. But this theoretical discussion has little to do with real world situations. I can't imagine any situation where a power transmission line would be erected on top of a pipeline. The pipeline owner simply would not permit such construction. Conversely, I can't believe a pipeline owner would attempt to place a pipeline under an established power transmission line. The article contains a photograph entitled "Powerline easement over a private road easement over a pipeline easement . . .," however the powerline is a crossing easement and not a longitudinal easement, which is an entirely different situation.

It is true that sometimes nonpermanent surface uses are permitted over the pipeline, but the lessees understand very clearly that if pipeline maintenance is required, their surface use can be interrupted or even destroyed, and there would be no reimbursement from either the pipeline company or the railroad. Further, neither company has any liability for an accident that might damage the lessee's interest. I doubt any power company would accept such conditions regarding the safety of their transmission lines.

The occupancy factors discussed in my previous article only apply to the area affected by the particular easement. If a pipeline easement was 15 feet wide, then the occupancy factor for that use—say 70% for discussion purposes—would only apply to that easement area. If the ATF value for that segment or district, derived from the analysis of sales of typical parcels in the area, was \$3.00 per square foot, the easement value would be \$2.10 per square foot. The remaining 30% of the fee interest would probably generate very little market interest. This same procedure would apply to the easement width of any or all other occupants of the corridor. Additionally, there are portions of the corridor which would remain unused and which could probably never be used.

I do not know of a single corridor in the United States that is 100% occupied. The argument that a corridor owner can sell more than is owned does not stand up to critical analysis. If the unlikely situation actually arose where one easement was on top of another, the owner would need to balance the occupancy factors so that they did not exceed 100%.

Let us consider a hypothetical example with a 100-foot corridor

being encumbered with a double-track railroad and easements for a 10-foot subsurface pipeline, a 25-foot wide power transmission line, a 5-foot wide subsurface sewer line and a 5-foot wide subsurface water line as shown below. How much of the total ownership rights has the owner sold to other parties?

The following diagram is a vertical view of the corridor which illustrates the encumbrances describe above.

Type of Easement	Width	Occupancy Factor
Subsurface Pipeline	10 feet wide	70%
Vacant Land		
Subsurface Sewer Line	5 feet wide	35%
Vacant Land		
Double Track Railroad	35 feet wide	100%
Subsurface Water Line	5 feet wide	35%
Vacant Land		
Overhead Power Transmission Line	25 feet wide	50%

Total Corridor Width = 100 feet

Type of Easement	Occupancy Factor	Percentage of the corridor affected	Percentage of the total fee interest affected
Railroad	100%	$35/100 = 35\%$	$100 \times .35 = 35\%$
Pipeline	70%	$10/100 = 10\%$	$.70 \times .10 = 7\%$
Transmission Line	50%	$25/100 = 25\%$	$.50 \times .25 = 12.5\%$
Sewer Line	35%	$05/100 = 5\%$	$.35 \times .05 = 1.75\%$
Water Line	35%	$05/100 = 5\%$	$.35 \times .05 = 1.75\%$
Unused land	0	$20/100 = 20\%$	0.00

As can be seen, even with a corridor heavily impacted with five users, only 58% of the total property rights have been sold, and 20% of the land area remains vacant and produces no income. This would be a far more typical example of corridor usage as opposed to the scenario posed in Mr. Schmick's article. This also illustrates the difficulty in using the Income Approach in corridor valuation.

Finally, the article refers to the Karvel decision tree as a need to correctly demonstrate knowledge of the appraisal subject. I have no argument with whatever method an appraiser uses in preparing

his analysis of the subject as long as it leads to a valid conclusion. My approach is somewhat simpler. I would ask these questions: What is the highest and best use of the property? Is there a continuing or proposed corridor use on the property, be it pipeline, power transmission line, fiber optic, water and sewer or commuter rail? If so, then the ATF approach is the correct approach. If not, then the net liquidation approach is probably the most likely candidate to be used for valuation. It is not necessary for there to be an active railroad on the property for it to be considered a corridor. ●



BASIC Economic Tools OF RIGHT OF WAY VALUATION

by Max J. Derbes, Jr., SR/WA, MAI, ASA

Available to appraisers of Right of Way are a number of economic principles which, if properly understood, can be of assistance in the mental processes leading to value. Most of these are known to experienced appraisers, although they may not recognize the importance of these "tools" or specifically identify some as part of the process. Following is a list of some of the more significant ones:

- Data Analysis Distillation
- Highest and Best Use Optimum Property Theory
- Theory of Relative Value
- Incentive Pricing Theory
- Overall Standards of Comparison
- Breakdown Method of Sales Analysis
- Diminimus/Equivalency/Maximum

Under ideal circumstances of a sufficiency of relatively similar, recent comparable data, the valuation thought processes do not require many of these economic theories. In reality, many right of way problems lack the luxury of adequate data. A brief discussion of the principle aspects of each "tool" are covered here to more specifically clarify the above methodologies.

DATA ANALYSIS DISTILLATION

After the identification of the property to be appraised and the right of way project involved comes the collection and analysis of data. In order to properly identify the relevant data, buyer and seller motivation and highest and best use require determination. Resolution of the subject property's highest and best use may need to wait until relevant data is fully analyzed.

Appraisers estimating market value need to focus the search for sales and rental data on the most pertinent. Therefore, the most significant market data will have the most similarity of physical features, buyer and seller motivation, and highest and best use. The thought processes involve recognizing the market of both the subject property and the comparables.

There are many obvious reasons why sales and rentals are not comparable:

- Physical differences indicate the comparable would not act in the same market as the subject property,
- Differences in highest and best use,
- Significant differences in land value-to-building value ratio,

- Questionable sale terms, sale of partial interests, sale of business, leasebacks, sales with large amounts of personal property, and
- Dissimilarity of the parties' motivation.

The buyer motivation can be broadly classified as: 1) Typically owner/occupied for occupancy and use such as single family homes, condominiums, and special-purpose industrial plants; 2) investment properties from small apartments up to multi-story office or hotel properties; and 3) speculative properties such as vacant land and properties in the path of progress.² These differences in motivation are basic, although, some appraisers who value large, viable owner/occupied industrial plants with sales of old abandoned plants converted to multi-tenant investments.

Understanding real estate markets involves understanding sub-markets. The physical aspects of different land parcels along a major collector road appear similar; however, small lots may operate in a different sub-market from large land plots which can house big-box retail outlets. In partial taking cases, the significance of sub-markets involves the total before market value and likewise the estimation of the market value of the remainder. In some cases, the before property operates in one sub-market and the remainder after the taking operates in another.

It is not possible to identify sub-markets by classifying highest and best use as industrial or commercial or residential. In each of these broad categories there are many types and sizes, uses and motivations. If a commercial is a strip shopping center, it is not a regional mall. If a manufacturing plant is the highest and best use, warehouses, distribution centers, truck terminals and so forth are also industrial, but not comparable to a manufacturing plant.

In right of way work (particularly cases which may be litigated), it may be advisable for appraisers to make note of sales which appear comparable and indicate in the appraisal report why the sales are not considered comparable. Such sales have been variously identified as "non-comparable" comparables and as "defensive comparables." Inclusion of these sales in the report reveals that the appraiser was aware of the sale and, in advance of litigation, explains why the sales is not relevant.

HIGHEST AND BEST USE - OPTIMUM PROPERTY THEORY

All three approaches to value - cost, market and income - are directly influenced by the highest and best conclusion of the appraiser. In the distillation process above, highest and best use of the subject property will dictate the selection of the most relevant data. Each parcel of improved land has two highest and best uses: that of the land as if vacant and ready for development and that of the improved property as existing. It is important in partial taking cases to recognize that both the before value and the value of the remainder may have different uses of both vacant land and the improved property. The market value of both the before value and the remainder value should be based upon a consideration of their respective highest and best use.

For each parcel of real estate there is an ideal combination of land and improvements which will accomplish the highest and best use and at the least cost. In the case of vacant land, speculative real estate, this may be to hold for future use.

In some circumstances such as a land parcel located on a strip commercial street, there may be a number of alternate uses such as a small office building, a retail commercial, a service station, a bank, and so forth. No one use is preferential for every parcel of land. The market indicates that all users will pay a similar amount per square foot for the land. For each use, there is an optimal proportion of land and improvements. The ideal mixture at optimal costs produces the optimal least cost and least cost of maintenance. Overadequate

monumental construction may be optimal to establish stability, strength, or reputation of institutions such as banks and even restaurants.

When appraising an older improved parcel, the difference between what is there and the optimum property helps establish the relative value of the subject property. Part of the effect of age, wear and tear, and even obsolescence, diminish the value in comparison with the optimum property. The effect of the taking on the remainders in partial taking cases also relates to the difference between the optimum property and the remainder property.

THEORY OF RELATIVE VALUE

All lands which compete in the market have a relative value to each other. Lands which have a slightly different highest and best use relate in value also. There is even a relative value to lands in a given locale which are worth more or less than the property being appraised. Obviously, it is easier to relate values of more similar properties than those in remote locations or of vastly different uses. Right of way appraisers should be particularly cognizant of the relative nature of values and the fact that the most similar properties will have the closest relationship.

All historic depreciation theories relate to the theory of relative value. Since the value of all improved properties lies at some point between zero and cost new, there is an identifiable relationship among all similar properties in the same market environment. When considerable physical difference exist among comparable improvement properties in an active market, the appropriate point on the value range can at times be identified more readily by the use of the cost approach than by direct sales comparison approach.

Relative values play a significant part in cases involving a whole series of somewhat similar properties in a right of way project. Insofar as practical, the appraiser needs to establish the value of each parcel taken as that parcel's value relates to all the others.

INCENTIVE PRICING THEORY

In real estate economics, older, less functional properties must be priced a levels that allow them to compete with new, optimal properties and with more desirable older properties. The incentive pricing of older properties reduces the buyer's original investment outlays. This reduces carrying costs and compensates the buyer for the higher maintenance and operating expenses of the real estate. The incentive pricing theory can be illustrated by a thermometer originally developed by Donald Treadwell, Sr. of Michigan.³

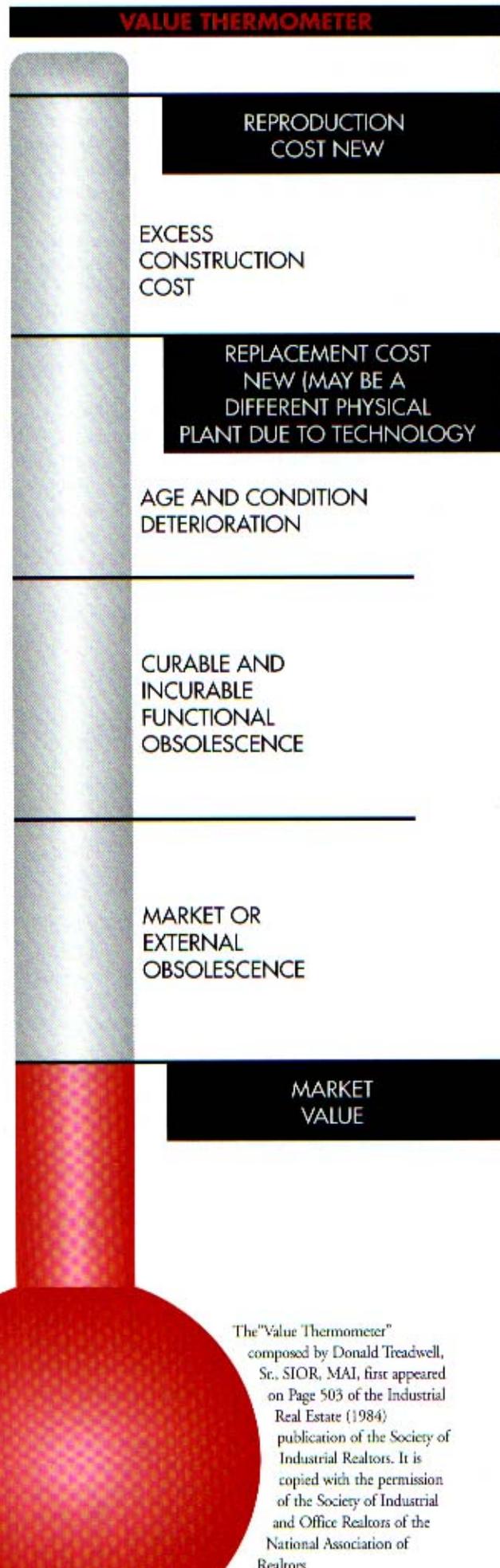
For example, assume that a single family house would rent for \$1,000 per month before any announcement or construction of the project. After the reduction of the front set-back from 30 feet to 15 feet, how much would the rent need to be reduced to attract renters. This is measured by the amount of incentive rent. Would the typical renter pay \$800 per month? Or \$700? Or what?

Incentive pricing relates to sale price also. If the house would sell for \$150,000 before the taking, what will the price need to be to attract buyers. If the only change is 15 feet of setback, could a typical buyer be attracted to the house with the price of \$140,000? Or, \$135,000? Or what? Incentive pricing is a reasonable tool to employ, especially in partial taking cases.

OVERALL STANDARDS OF COMPARISON⁴

Appraisers should think in terms of units of measure or standards when comparing unimproved land. The price per front foot of land is typically not accurate except when the depths are proximate for both the comparable and the subject. The use of land area standards such as per square foot or per acre apply in all other cases. Area standards are particularly significant when there exists a significant amount of data.

Standards of measure are useful in illustrating relative value. Differences among the various comparables can be observed with the use of standards; however, appraisers should be cautious about adjusting sales when using the standard. For example, if \$10,000 worth of fill is need on the subject property as compared with the comparable, the unit price of \$6.00 per square foot of the comparable should not be adjusted down 10% (i.e. \$0.60 per square foot) if the \$10,000 amounts to but \$0.25 per square foot for subject's 40,000 square feet. The per standard adjustment should logically relate to the appropriate gross dollar adjustment.



The "Value Thermometer" composed by Donald Treadwell, Sr., SIOR, MAI, first appeared on Page 503 of the Industrial Real Estate (1984) publication of the Society of Industrial Realtors. It is copied with the permission of the Society of Industrial and Office Realtors of the National Association of Realtors.

For improved property, there are two overall standards: price per square foot overall including land, minor improvements, and yard improvements; and price per square foot net of the major improvement. In the former case, the square footage of the major improvements of the comparable is divided into its total sales price. In the latter case, the breakdown method of sales analysis (explained below) is used.

There is no need to use the breakdown method of sales analysis when the percentage of value of the land, minor improvements and yard improvements of the comparable and the subject property are somewhat similar. Overall standards are useful in the selection of comparable data when there exists a significant amount of such data.

It may be possible to use overall standards as a comparative method by making adjustments for differences in land, minor building and yard improvement values. To illustrate, assume that the comparable's land value is \$200,000 in excess of subject's land value. It may be possible to adjust the comparable's sale price down \$200,000 and use the resultant square foot overall price as adjusted:

Actual: \$1,800,000 price for 50,000 square foot building = \$36/Per S.F.

Adjustment: \$1,800,000 minus \$200,000 = \$1,600,000

Standard: \$1,600,000 divided by 50,000 SF = \$32.00/Per S.F. Overall

BREAKDOWN METHOD OF SALES ANALYSIS

In this system, the total price paid for an improved property is allocated to the various components of the physical property as follows:

Land: The estimate market value of the land is estimated based upon comparable sales. Usually, the market value of the land as if theoretically vacant and available for development is used; however, for underutilized land, the market value of the land for the existing use may be more relevant.

Minor Building Improvements: Residences may have carports or garages and other minor building improvements such as a garden storage shed or a swimming pool. Industrial properties often have smaller buildings. The market value contribution of these minor building improvements need to be estimated based upon cost less accrued depreciation or on sales experience. Age and function are significant in the value of these.

Yard Improvements: Most improved real estate has yard improvements such as drives, parking areas, fences, landscaping, and so forth. An allocation of a portion of the purchase price should be estimated based upon either cost less depreciation or sales experience. The older the improvements, the less they contribute.

Major Improvement(s): The estimated price per square foot for the major improvement(s) is the residual of the purchase price after deducting from the total price paid, the estimated allocation of the price estimated for the above three categories.

The methodology of the breakdown method of comparable sales analysis "prices" the least valuable physical property which results in an indicated market value per square foot of the major building. The residual value for the main building will be slightly distorted by errors in the estimation of the contributory value of the land and minor improvements; however, the error will not be significant if similar errors are consistently applied to all the comparables.

Since most right of way valuation demands pin point estimates, the appraiser is responsible to determine where on the range of values reasonable truth lies.

Once the value per square foot of the comparable's major building is calculated, the building can be compared with the subject property's building and adjustments plus or minus per square foot for the differences can be measured. Once all of the comparables sales have been likewise studied, the eventual resolve of the probably per square foot value of the subject's major building can be estimated. To derive the indicated value of the subject property, the "build-back" process involves the indicated value of the improvement plus the land value of subject property is estimated from the market and an estimate of the contributory value of the minor building improvements and the yard improvements.

The breakdown method of comparable sales analysis works when there are a few sales of similar properties with

variations of percentage of value contribution of the main building, land value, minor buildings and yard improvements. Adjustments for these differences can be logically made once the important sales evidence of the value of the main building has been derived. This is an economic tool of great importance if approached logically and objectively.

DIMINIMUS/EQUIVALENCY/MAXIMUM

From the beginning of the process of estimating just compensation for a right of way all the way to the final report, the data found and analyzed tends to indicate ranges of value for the total property value before the taking, for the part taken, and for any diminution in value to the remainder. Such data tends to indicate a range of value. It identifies the diminimus or lower limit of value. Mainly, the data should also indicate an equivalency. Furthermore, the data indicates a maximum. Since most right of way valuation demands pin point estimates, the appraiser is responsible to determine where on the range of values reasonable truth lies.

Such a decision should not, in any way, relate to averages. Value decisions should be based upon logic and objective, studied judgement. The "tool": appraisers have is to recognize the validity of ranges of value and the logic and reasonableness of final determinations. Understanding the motivations and propensities of buyers and sellers in the particular sub-market in which the property operates gives meaning to the term "market value."

1 Many of the ideas in this article were included in the publication of the Society of Industrial Realtors, *Industrial Real Estate*, 1984, Chapter 12, pages 497-529. This chapter was composed by Max J. Derbes, Jr.

2 Max J. Derbes, Jr., "Use, Development, or Speculation of Real Estate", *The Appraisal Journal*, April 1964, pages 219-228.

3 *Industrial Real Estate*, Ibid, pages 501-503.

4 *Industrial Real Estate*, Ibid, page 508.



Complexities of Pipeline Easement Damages on Midwest Farmland

BY JOHN SCHMICK

As the population of this country grows, there is an increased need to bring energy supplies (such as natural gas) to the cities and towns experiencing that growth. The delivery of natural gas by underground pipeline is one method of meeting those energy needs. This presents a challenge to the right of way professional who is assigned the task of determining damages. It is often necessary to use eminent domain laws to take private property for permanent pipeline easements and temporary construction easements. The recent experiences of farmers between Fairmont and Hutchinson, Minnesota, illustrate the difficulty in meeting the energy needs of a growing population, and highlight the complexity of damages caused by an underground pipeline.

In general, eminent domain cases involving utility construction projects may be viewed as following either a positive approach or a negative approach. Using a positive approach, the condemning authority maintains open lines of communication, works with property owners to minimize project impact, and offers compensation considered sufficient by the property owner to avoid litigation. In the negative approach, the condemning authority is more likely to issue statements and orders, develop the project without input from property owners, and attempt to buy easements as cheaply as possible. The process often involves low initial offers and uses eminent domain actions as weapons in negotiations. Whether intentionally or not, the statements and testimony of property owners in the Hutchinson pipeline case made it clear that this project was not viewed as a positive process.

In Minnesota, eminent domain actions are initially heard by commissioners appointed by the district court. Each group of commissioners typically includes one attorney and two real estate professionals. An informal hearing is held with witnesses, testimony and cross-examination. Attorneys for the property owner and condemning authority decide jointly if they want a court reporter to make a record of the hearing, but it is not a requirement. Decisions by the commissioners may be appealed to the district court for a formal trial. (In this article, the terms court, trial and hearing refer to the commissioners' hearing of the case.)

History of the Case

In 2003, the City of Hutchinson, Minnesota, acting through the Hutchinson Utility Commission, constructed a 91-mile underground natural gas pipeline from approximately the Iowa/Minnesota border, north to the city of Hutchinson, Minnesota. (For our purposes, the City of Hutchinson and the Hutchinson Utility Commission are referred to jointly as Hutchinson.) To facilitate the project, Hutchinson began the process of acquiring easements from property owners in six different counties. Hutchinson's initial action was to send a right of way agent to sign up as many property owners as possible. The majority of these owners either farmed the land or rented it to others for farming operations. The predominant field crops were corn and soybeans planted on a rotating basis.

Payments made to those who accepted the initial offer were based on approximately \$2.50 per linear foot of pipeline easement on the property. However, since the exact route of the pipeline had not been selected and surveyed, only an estimate for payments due under this process could be made. In addition, these initial easement requests were “blanket” easements which covered the entire field rather than the 50-foot width needed for the pipeline. The routing permit granted to Hutchinson provided a corridor varying in width up to 1.25 miles within which it could locate its pipeline. Ultimately, one group of property owners, citing a lack of information and compensation, rejected the initial offer and forced the start of eminent domain proceedings. Because of the number of property owners in the group, it was decided that holding hearings on all of the properties would cause an unreasonable burden on both sides. Seven representative properties from the group were selected and hearings were held on those parcels. It was anticipated that the commissioners’ decisions on those seven properties could be used to settle all claims with two or three exceptions for properties that were ripe for development or had other unique issues that needed to be addressed separately.

The following is a discussion of some of the more significant physical and legal issues presented during the Hutchinson pipeline project.

Physical Impacts

Crop Loss: While neither the property owner nor the condemning authority disputed the need to compensate farmers for crops lost during the construction of the pipeline, there was some discussion as to how to estimate those damages. Actual construction occurred between July and November of the 2003 growing season. The value of those crops, and therefore the payments owed, were still not determined until the final hearings in the spring of 2006. At issue was the question of whether the value should be set as of the date of taking in July 2003 or when the farmers would normally have marketed that year’s crops. Testimony indicated that crop value is cyclical, and most area farmers sell their crops in the spring when prices are higher. In addition, should the price be based on local grain elevator prices, co-op prices, or the price in a published index? It was difficult enough for the property owners to see their crops being plowed under, often with little notice, but to wait two years to be paid for the crops was generally considered unacceptable by the owners.

Damaged Drain Tile: Soil in the southern part of Minnesota is generally of such good quality that drain tile is commonly used to facilitate removal of excess moisture before it can cause root damage to plants. Most fields contain an extensive network of



Erosion of soil in easement area.

drain tiles to protect those areas that are susceptible to retaining excess water. Testimony indicated that during construction, work crews made no effort to locate and preserve the existing drain tile system. Rather, they cut right through the tiles, patching the tiles after the pipeline construction was completed. However, the work crews used non-slotted pipes for the drain tile patches, laying it across the pipeline trench. Unfortunately, a drain pipe with no holes or slots for water does not encourage drainage. Instead, water must flow to either end of the non-slotted pipe area and into the existing slotted pipe before it can drain away. As a result, normal water flow was disrupted and drainage hindered. This led to inadequate drainage, plant root damage and lower crop yields.

Soil Compaction: Because pipeline construction requires the use of heavy equipment, it is common to find that soil on either side of the trench suffers some degree of compaction. The Hutchinson pipeline compaction was measured to a depth of approximately 24 inches. The effect is that plant roots may not be able to successfully penetrate the compacted soils, resulting in a “pancake”: the flattening of the roots at shallower depths which leads to lower crop yields. The degree of soil compaction is also affected by weather conditions during construction. One study cited by a soil expert indicated that wet construction conditions can lead to greater compaction. In another study by this same expert, crop yield loss was measured for as long as 14 years after construction on a major pipeline in this same area.

Soil compaction has a negative impact on crop yields, but in some cases it can be mitigated by a technique called ripping the soil. In this case, however, there was testimony that existing equipment (in the area) could rip to a depth of only 12 to 14 inches. Consequently, the soil compaction problem at a depth of 24 inches could not be resolved.

Lack of Soil Compaction: Soils disturbed during the trenching process generally have a greater mass because more air is contained in the soil. Over time, this fill soil can settle as much as 30 percent. In this case, soil was returned to the trench after construction of the pipeline, but it was not adequately compacted. This created a number of problems. One farmer reported that his harvesting equipment became mired in the pipeline trench because of soft soils, and he had to be pulled out. Several farmers indicated they felt a dip every time their harvesting equipment passed over the trench. One farmer suffered substantial equipment damage when the front of his harvesting equipment tipped into a low spot in the trench area and struck the bank on the other side, breaking several nose points. His cost to repair this during harvest time was more than \$4,000 in labor and parts.

Normal farming activity accelerated the settling process and changed the contour of the land. This in turn impacted the normal water flows or drainage on the field. Water tends to take the path of least resistance. As the trench area settled, water followed the depression or channel created in the trench. In some areas, this created new wet spots in the field and was expected to increase erosion over time. One property owner had to have a berm built to divert water and control erosion. This took land out of production and interfered with established planting and harvesting patterns.

There was an additional concern that the pipeline trench, with its soft soils locked between the compacted soils of the trench sides, would act as a water collector – allowing water to follow the trench to areas where it would pond or otherwise saturate the soils. In some cases, additional drain tile will need to be installed to address new areas of excess water. What can be concerning is that some of these water problems may not show up for several years. How do right of way professionals and commissioners determine compensation based on anticipated future damage?



Construction road through farm field creates soil compaction.

Yield Loss and Additional Costs: All of the problems described above can be expected to lead to a loss of crop yield, not only in the pipeline easement area but in temporary construction areas as well. The degree and duration of crop yield loss are somewhat of a gray area because different experts, using different assumptions, will find and report varying levels of damage. In this case, a study prepared by one soil expert looked at crop yields on a major natural gas pipeline constructed in the area. In that report, the expert was able to measure crop yield losses in the easement area in the fourteenth and fifteenth years after construction, although yield losses diminished over time.

The degree of care used during construction of this project created additional problems. Specifically, there were indications that construction debris was pushed into the pipeline trench and buried. As least one farmer lost a milk cow which ingested a piece of buried fence wire that perforated its stomach. Additionally, in restoring the surface area, there were indications that top soil was mixed with subsoil in some areas. A local newspaper reported on formerly rock-free top soil that was now littered with rock in many areas. Most property owners affected by this pipeline project reported having to use extra fertilizer in an attempt to mitigate the impact caused by soil mixing. This had a direct negative impact on crop yields in those areas which was expected to last for many years. In a direct correlation, if the expected productivity of the field declines, combined with higher production costs, the market's reaction is to discount the value of the field.

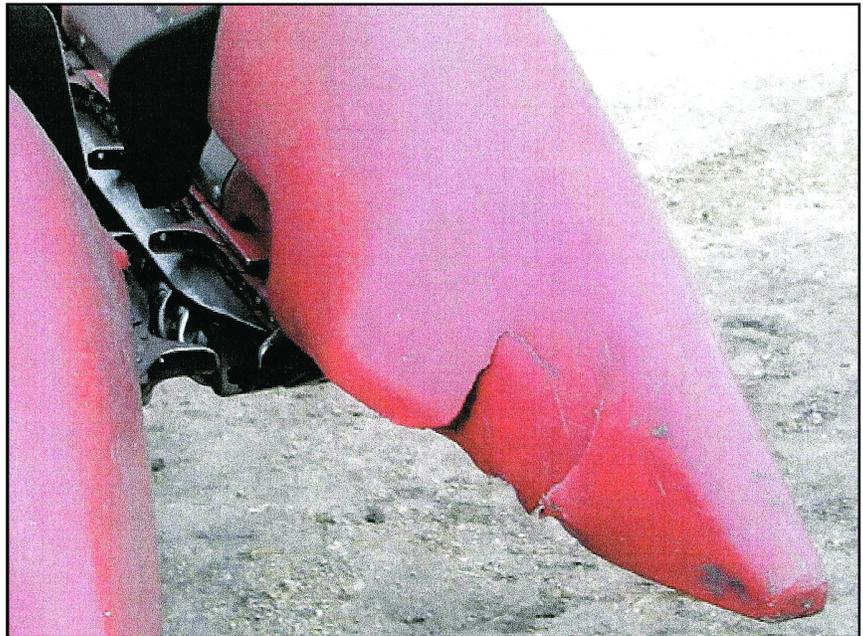
Non-Physical Damages

Easement rights: Beyond the physical impact of the pipeline project, there were numerous impacts related to the easement terms and conditions imposed on the land. The blanket easement condition was mentioned earlier, but a more thorough examination of the easement terms is necessary. Initial offers to property owners included an easement description that defined the taking as a 50-foot wide strip of land on the owner's land parcel. However, at no time was the location of the pipeline within that field specifically identified. As a result, the condemning authority took the right to a 50-foot wide strip of land anywhere on the field that it wanted. Furthermore, the easement document gave the condemner the right to move the 50-foot wide strip for any reason it wanted. The end result of this condition was that the condemner took the right to occupy any portion of the field at any time, effectively creating a blanket easement over the entire field. For those property owners who accepted the initial offers, this issue could only be corrected at the owner's expense, as the condemner stated that it had no requirement to go back to those owners and make corrections.

Closely related to the issue of blanket easements is the lack of recordable surveys for the pipeline location. Initially, the construction was done on a fast track schedule where the construction crews basically showed up one day, arbitrarily decided where they were going to trench and then ran their equipment through the field. It was reported that they took occasional G.P.S. readings, but none of this information was shared with the property owners. As the hearing dates approached in the spring of 2006, a full two years after construction had been completed, as-built surveys were still unavailable to the property owners. It was not until a few days before the hearings that surveys of the seven test cases were completed and produced for the property owners. As part of the hearing process, the condemner verbally promised to complete as-built surveys for all of the property owners who were part of the litigation. No property owner who had settled earlier or who was not part of the group challenging the offers would get a recordable survey of the as-built pipeline. As a result, dozens of property owners will someday have to spend the time and money to obtain a recordable survey so that a potential buyer of the land will know where the pipeline is located. Those subsequent owners will not receive compensation for these future costs.

Another interesting term and condition of the easement document was that it granted the right “. . . to enter, from time to time, upon Respondent’s Lands, along any routes reasonably convenient to Petitioner ...” While granting access to the easement area is a normal part of any easement, what was unique in this situation is that the condemner also took the right of determining how access would be allowed. In this case, the language allowed the condemner to enter the owner’s field at any point, cross any part of the field, and leave by any route it wanted. There was no requirement on the part of the condemner to minimize the impact of its access rights, nor was there any language inserted that required the condemner to reimburse the owner for any crop loss or other damages caused by exercising its access rights. The effect of these access rights was to place all future crops, anywhere in the field, at risk of destruction any time the condemner decided to enter the field for almost any reason with no expectation of compensation and no requirement of advance notice of entry. Consequently, the risk of yield loss was increased for each property burdened by the blanket access condition contained within the easement document.

Finally, the easement document did not indemnify the property owner against claims from others resulting from the construction, operation or removal of the pipeline. Nor was the property owner protected against claims by the pipeline owner/operator for any damage caused by normal farming operations permitted in the easement area. It also allowed the pipeline owner to abandon the pipeline in place when its use was discontinued. These issues are



Damage to equipment after sinking in soft soil in trench.

common in most pipeline easements, but the property owner is normally given full indemnification and restoration protection.

Determining the Value

Eminent domain cases in Minnesota follow the federal rule in estimating damages whereby the value Before-the-taking, minus the value After-the-taking equals Damages. Value refers to the whole property (larger parcel), not just the easement area. The significant differences in values concluded by the experts for both the property owners and the condemner highlight how difficult it is to reach a decision on damages. It is instructive to briefly discuss the process that each side used to arrive at its values.

A common but questionable method of measuring easement damages is the percent-of-fee-simple method. The appraiser selects a percentage of the fee simple interest value and applies it to the easement area only. Unfortunately, rarely in the application of the percent-of-fee-simple method is there an offering of market-based support for the percentage rate applied to the fee simple interest unit value. In this case, the condemner’s expert used 50 percent of the fee simple unit value, multiplied it by the total easement area and labeled it damages. As it relates to the federal rule for estimating damages (as required by the court in this case), the percent of fee loss was subtracted from the Before-the-taking value to arrive at the After-the-taking value. This creates a circular logic, because the appraiser estimates damages to find the After-the-taking value which is subtracted from the Before-the-taking value to find damages. The estimate of damages based on circular logic does not comply with the federal rule. Furthermore, the idea of estimating damages so that you can find damages is far-fetched at best and unscientific at worst.

Estimating Damages: Federal Rule vs. Circular Logic

Federal Rule	Circular Logic
A = Before Value of the Larger Parcel	A = Before Value: Unit Value
<u>- B = After Value of the Larger Parcel</u>	<u>- C = Percent of Fee Loss (Damages)</u>
C = Damages	B = After Value: Unit Value
	Therefore:
	A = Before Value of the Larger Parcel
	<u>- B = After Value of the Larger Parcel</u>
	C = Damages

This circular logic is illustrated in the table above.

The interesting part of the percent-of-fee-simple method is that it will never identify severance damages, because it is only applied to the easement area. The expert for the condemner looked at dozens of sale transactions and interviewed both buyers and sellers. He concluded that buyers did not attribute any significance to the existence of a pipeline on farmland they purchased. Thus, verbal statements by market participants were used to eliminate severance concerns. This same expert produced a separate study of pipeline impacts that contradicted this conclusion. That pipeline impact study, when subjected to a matched pair analysis, clearly demonstrated that sales of farmland with a pipeline sold for less per acre than did farmland without a pipeline. Consequently, severance was demonstrated in a four-county area studied for this new pipeline. The dilemma for appraisers and decision makers is to decide what carries more weight; verbal statements by market participants or actual matched pair comparisons of transaction data by those same participants.

The valuation expert for the property owners used a different approach. His study involved 67 comparable sales in a two-county area. Basing the unit of comparison on tillable acreage, the data was analyzed on a bulk basis for trends in pricing related to size, adjacent buyer influences, access road influences (gravel or paved), location and crop equivalence ratings (CERs). CER is a process of rating soil types and characteristics and calculating a weighted point reference for each property in the county. It can be used to compare the expected productivity of a parcel of land for crop production. A buyer, given the choice to buy a field with a CER of 75 points or a field with a CER of 88 points, would know that the higher CER rating would produce a higher crop yield if all other inputs were held constant. Trends in the data supported a sliding scale for land prices positively correlated to the CER ratings of the land.

With all factors considered, the data trend analysis and matched pair analysis used by the property owners' experts clearly demonstrated a loss in value to the entire field when a pipeline was present. Combining the pipeline impact study data by the condemner's expert with the land study by the property owners' experts resulted in a clear pattern. In four of the six counties through which the new pipeline passed, farmland with an existing pipeline sold for substantially less than farmland without a pipeline, sometimes by as much as \$400 per acre for the entire field. The range of impact was related to where the pipeline crossed the property. A pipeline that went through the middle of the field had more impact than a pipeline that crossed the corner of a field. Consequently, although the buyers themselves may say that an existing pipeline did not influence pricing of land, the transactional data of those same buyers demonstrates otherwise. Clearly, anything that impacts crop yields, increases risk of ownership, and results in future losses will also impact pricing.

In this case, initial offers to property owners for easement rights were made at approximately \$2.50 per linear foot. At the commissioners' hearing, the offers were approximately \$4.00 per linear foot. The commissioners awarded a range of \$6.00 to \$11.00 per linear foot for the test properties and, in an unusual move, imposed conditions for indemnification and responsibility for future drain tile system failures. Thereafter, the two sides mediated a settlement whereby Hutchinson did not oppose release of \$150,000 deposited with the Minnesota Department of Agriculture pursuant to a Stipulation Agreement between Hutchinson and the Environmental Quality Board. This raised the cash portion of the settlement, with



Rocks left in easement area after construction.



Construction debris recovered from easement area.

interest, to approximately \$9.75 per linear foot. In addition, the mediated settlement included the following conditions:

- Non-emergency access routes designated by the property owner,
- Notification before entry onto the owner's property,
- Compensation for future damages related to pipeline operations,
- Vacation of easement in event of pipeline abandonment and removal as needed per property owner's construction of improvements,
- Restriction of easement to a single pipeline (additional pipelines require additional easements.)
- Provide and grade additional top soil, as needed, to alleviate settling of surface areas in the easement area.

The final award represented a compromise between the valuation testimony given by the experts.

The mediated settlement adds the protection property owners need when a pipeline burdens their property. To put the final award in perspective, during the study period in the area, general land prices, with a few exceptions, were between about \$2,000 per tillable acre to \$3,400 per tillable acre. Based on a 50-foot wide easement, the initial \$2.50 per linear foot offer equates to approximately \$2,178 per tillable acre; the \$4.00 per linear foot offer at the hearings equates to \$3,485 per tillable acre; and the mediated settlement, after commissioners' award, equates to \$8,494 per tillable acre. Clearly the award in this case reflected loss in value to the entire field, or severance damages.

Conclusion

This was a pipeline easement case that started out poorly and deteriorated as it went forward. While much has been written about how to make the utility construction/right of way acquisition process go more smoothly, this project was a case study in everything a condemning authority should not do. From the beginning (inadequate offers of compensation and threats of eminent domain taking) to the end (condemning authority found in violation of its own agricultural mitigation plan and commissioners' award), it was a negative experience for all participants.

The duty of a condemning authority in eminent domain is to make the property owner whole. It is not to acquire property rights as cheaply as possible. This is the true meaning of the term "just compensation." There is always a tradeoff between treating property owners fairly and litigation expenses. For the appraiser, there is no substitute for thorough research and common sense analysis. A new pipeline constructed through good quality farmland causes much more damage than can be seen by looking at the surface of the land. Easement terms and construction activities can lead to greater risk in ownership, future crop losses, and a frustrating long-term relationship with an easement owner. ●



Water in the easement area after construction.

Bundle Of Rights Theory Applied To Valuation Of Easements And Rights-Of-Way

By ROBERT CRAIG, AACI, FRICS

A long time ago it was an accepted fact that a man's home was his castle. That is to say, he could do whatever he desired with his property. He, and he alone, owned it and could control its use, misuse or non-use. He had the right to occupy it and deny occupation to others. He could build what he liked or destroy what had already been built. He could enter it at will or depart from it at will. He could allow others to occupy it, but only with his concurrence and agreement.

This was not only true of the surface, but also was considered to apply equally to the soil below the surface, right down to the very centre of the earth. Similarly, he completely owned all of the space above his property. In fact if his earthly property boundaries were, for example, in the form of a square, then the extent of his ownership was an almost limitless inverted pyramid, with the apex at the centre of the earth and the base of the pyramid somewhere out in infinite space . . . beyond imagination.

Ownership -- Bundle of Rights

To illustrate this concept of ownership let's consider a bundle of sticks. This bundle of sticks represents the complete package of man's original concept of ownership. Each stick represents one of the rights included in the overall package: The right to enter; the right to use for any purpose; the right to improve in any fashion; the right to deny entrance to others; the right to permit entrance by others; the right to rent or lease for fixed terms; the right to build whatever he

wants; the right to demolish a building; the right to grow trees or crops of any kind; the right to cut down trees; the right to sell or part with his ownership; and so on. In addition he has the right not to do any of these things.

The small known world of man expanded, many years ago, as new lands were "discovered." Such discoveries were usually made by individuals or groups of individuals on behalf of a King or a country. Huge areas of land were claimed in the name of the King. The bundle of sticks was taken over by the King. Later, perhaps in return for services rendered, the King granted to selected individuals, a tract of land here, or a tract of land there - sometimes small - sometimes large. And so it was with the continent of North America. The King gave away a bundle.

However, the *entire* bundle of rights was seldom, if ever, granted. Usually there was a holdback. Perhaps the grant of ownership stipulated that such grant would only continue subject to certain services being provided to the King upon demand, or subject to certain periodic payments of goods, or perhaps of rent.

The new owner didn't really have complete unconditional ownership and control of the land forever and ever. His package was something less than complete. One or more of the rights of absolute ownership had been conditionally removed. Let's subtract two sticks from the bundle.

In law however, and in the eyes of the people of the land, he was still the owner . . . i.e. the owner of something

less than absolute ownership. His "home" or his "castle" had lost just a little of its stature, and if he failed to meet his commitments, he could lose it.

Civilization Marches On

With the advance of civilization, owners of land started to make demands upon the King, through his governing bodies. They wanted protection from marauders - which meant the provision of soldiers or police. They demanded protection from the ravages of fire - which meant fire fighter or fire brigades. These and many other services cost money - money which, it was deemed, should come from those requiring the services. That was fine, as far as it went. But what if an owner refused to pay his share. The answer was obvious. Take back the "ownership" of the land. And so it came to pass that the owner would only be permitted to continue his ownership of the package, provided that he met these commitments, later to be called TAXES.

In more modern times it is recognized that there are a number of governmental limitations on the rights of ownership, and these are briefly as follows:

The Right of Taxation

As mentioned above, different levels of government - Federal, Provincial (Canada), State (USA), municipal (cities, towns, villages, etc.) - have passed laws which require the owner to make payment of taxes at various times and for various reasons. Failure to make payments when demanded, or within certain time limits,

can result in loss of ownership. Take another stick away from the bundle.

The Right to Police

As populations became more concentrated, it became necessary for the Government to pass laws to control the use of property for the good of others. Health, building and zoning laws were passed. Take another stick from the bundle.

The Right to Expropriate Or Condemn

With the advance of our modern society, it was found that sometimes certain public projects required the use of privately owned property. Initially, it was only necessary to haggle with the owner as to price and the property could be purchased. However, some owners didn't want to part with part or all of their property, and the proposed project was held up or even prevented from going forward, so the government passed laws to allow them to expropriate or condemn the property for public use. In other words, the government (at various levels) could take away the ownership of the property. Of course, they had to pay compensation to the former owner.

The same powers of expropriation (condemnation) were also given to quasi-governmental bodies and in many cases to large privately owned companies such as railroads, electricity companies, gas companies and so on. Take another stick from the bundle.

The Right of Escheat

It sometimes happened that a property owner died without leaving any heirs and without leaving a will. Rather than have all the neighbours scrambling to take over the ownership of the property, the Government decided that, in such a case, the ownership of the property would revert to the Government. This is referred to as escheat. Take yet another stick from the bundle.

Real Property Concept

I am trying to establish the concept that modern day ownership of property embraces a great many rights, but not absolute rights, to the

property. The package we know as "ownership" has many limitations thereon, of a hereditary or governmental character. This package is now represented by the bundle of sticks that remains; still a substantial bundle, but much reduced from the original "castle" that was owned by King Arthur, or given to one of his Knights. Even so, the package is still a substantial bundle, and still includes: The right to use (subject to governmental controls); the right to enter (more or less without restriction); the right to lease (subject to perhaps the need to register the lease); the right to improve (subject to governmental controls); the right to deny entrance to most others (but not certain governmental inspectors, etc.); the right to demolish a building (but not if it has been declared a historic site, etc.); the right to grow trees and crops (but not necessarily the right to cut down trees); the right to sell or part with ownership (subject perhaps to capital gains tax); and so on. In addition the right not to do any of these things except you could for example be forced to demolish a dangerous structure, or to remove a structure which constituted a health hazard.

Market Value

And so we come to the basis of almost all valuation, including most easement and right-of-way valuations, namely market value. For the purpose of this talk I do not propose to delve too deeply into the many facets of market value, or the many definitions of market value. There is however one definition to which I would like to refer and leave with you for your consideration:

"The highest price estimated in terms of money which a property will bring if exposed for sale in the open market allowing a reasonable time to find a purchaser who buys with knowledge of all the uses to which it is adapted and for which it is capable of being used."

This definition was, I believe, first set out in a legal decision in a condemnation case in California, and has been extensively used in the United States and also in Canada. It is a good definition, in that it qualifies to a

considerable degree the situation and circumstances, or terms of reference, under which the estimate of value is being made.

Right-Of-Way

For what purposes would someone require a right-of-way? The following, though not a complete list, embraces most of the uses with which we as members of the American Right of Way Association are familiar: Roadways; electricity transmission lines; gas pipelines; water mains; sewers; rights of access to another property; footpaths; and others. As I said, the list is not all embracing and there may be omissions, but this is not important for the purpose of this talk.

Fee Versus Easement

Some of the above uses could be for public or quasi-public purposes, but some could be for private purposes, acquired by negotiation or acquired by expropriation or by negotiation under the "cloud of expropriation."

Some of the above rights-of-way could entail the acquisition of the fee in the land, i.e. the whole residual bundle of rights in the possession of the former owner. Some, however, may be more in the nature of easements, to take only specified uses of the land, but still leave certain rights belonging to the former owner. In other words, the bundle is split -- part remains with the former owner, and part (of the bundle, that is) is conveyed to the person or party, government body or utility company, or whatever, that desires to make those specified uses of the land.

At this point this question arises. "Just how many sticks does the acquiring party require? Does he (the acquirer or purchaser) require only a few sticks, or does he require a lot of sticks?" Naturally the more he requires, the fewer will remain to the owner of the fee. Also, I submit, the more he takes, the more he will have to pay as the price of acquisition. If he takes the whole bundle (and it is an entire taking, not a partial taking) then he will presumably have to pay, as a minimum, the market value of the property at the date of taking. If the property was being used for business

purposes, he may have to pay more than market value, and I will touch on this later. Sometimes the taking of only a small number of rights can leave the owner with very little utility in the balance, and he may be required to take the entire interest.

The main point that I am making is that the former owner had in his possession a bundle of rights (represented by the bundle of sticks), and he is being asked or forced to part with some or all of those rights. He must be compensated commensurate with the number of rights taken from him. If he had already parted with some of his rights (e.g. by way of lease or by a former grant of an easement) then the measurement, or the measurement base, i.e. the bundle he starts with, is that much smaller to begin with. This must receive consideration. Whatever the size of the bundle he starts with, this bundle presumably has a measurable market value, and that generally is the starting point in the calculation or estimate of the value of the number of rights that are being taken away from an owner.

At this point I would like to make it quite clear that, insofar as I am concerned, market value is never a positive figure, it is never "determined," it is always "estimated." Its accuracy or reliability is only as good as the individual who makes the estimate, and only as good as the reliability of the facts and data used by that individual, and only as good as the degree of professional skill applied to the interpretation of those facts and data.

Already we can see that the valuation of a right-of-way is not a simple matter, but is filled with these complications: Those requiring consideration of the starting point (market value of the owner's bundle of rights); those relating to the number of rights to be taken from the owner, and relating to the number of rights to remain with the owner; and those regarding the nature of the intended use to be made of the right-of-way. I intend to come back to this latter problem later.

Urban, Rural, Rurban Property

There can be, and usually is, a considerable difference in the valuation of urban property and the valuation of rural property, and I am not speaking only about the difference in dollar amounts. The whole procedure and the whole basis is generally different. Most of my appraisal life has been spent in dealing with urban property, and I try to avoid getting involved with rural valuation problems.

In a similar way, it naturally follows that the valuation of a right-of-way is also quite different when dealing with urban versus rural problems.

There is also a third category of property which I will refer to as rurban property, which falls broadly speaking, in between. This class consists of those areas of lands on the fringe of developed urban areas that are approaching the time when such lands will become "ripe" for development. The Borough in which I work (Borough of Scarborough) forms part of the Toronto Metropolitan Area. There are six Boroughs in all, and we have a two tier form of Municipal Government. Scarborough has a population of more than 400,000 persons and is increasing by about 20,000 to 25,000 persons per year, plus associated amenities such as stores, schools, churches, etc. We have the only substantial area of vacant land remaining in Metro, much of it still farmland.

Taking Of The Whole Versus Partial Taking

To complicate the problems of valuations of rights-of-way still further there is the difference of the procedures of valuing an entire property versus the problems of a partial taking. In point of fact, however, it should be recognized that the taking of an easement, or a right-of-way in the nature of an easement, in itself, constitutes a partial taking. Also, when only part of a property is required for an easement, we may have a double effect to consider - i.e. the loss in value to the area within the easement, and the loss in value, if any, to the remaining portion of the owner's lands outside the easement area. In such

cases the appraiser may find himself involved in the measurement of what is referred to as "injurious affection," i.e. the loss in value to the land outside the easement or right-of-way area, caused by the construction of the particular undertaking for which the easement or right-of-way was acquired. This is a somewhat specialized subject, and I will not attempt to discuss it in any depth here, but knowledge of the subject is essential for the valuation of this type of problem.

Easements and rights-of-way are rarely of a private nature, but are normally acquired by an Authority with powers of expropriation or condemnation. Even though the easement or right-of-way is acquired by negotiation, without the need to resort to expropriation, it must never be forgotten that these negotiations are conducted under the "cloud of expropriation," and in all fairness, the owner should be given all of the benefits that he would have had under the law, if he was being expropriated. An appraiser/negotiator should never try to take advantage of an owner because of his lack of knowledge of the Laws of Expropriation.

This means that if the individual conducting the negotiations is to properly perform his task, he must have some knowledge of expropriation or condemnation law, and furthermore, must have some knowledge of how the Courts have interpreted that law. This is, perhaps, not too important in the case of the taking or acquisition of an entire property, i.e. the entire bundle of rights, but it is most important in the case of a partial taking, i.e. the taking or acquisition of part of an owner's property. As I have explained, a right-of-way in the nature of an easement constitutes the taking of only part of the owner's property rights, and this matter of having knowledge of the law of expropriation is therefore most important.

Expropriation Law In Ontario

We in Ontario are somewhat fortunate in that we have basically only two acts with which to concern ourselves in acquiring land under

expropriation, or under the cloud of expropriation - namely the Provincial Expropriation Act, that applies to all levels of Government or Expropriating Authorities below the Federal level, and the Federal Expropriation Act applicable at the Federal level. The provincial act, unfortunately for us, is slanted very strongly in favour of the property owner. So much so, that a property owner has very little to lose by fighting the Expropriating Authority all the way. He is guaranteed payment of his legal and appraisal fees, even if he loses a case before the Courts. It's tough, but that's the way it is.

Briefly the Provincial Act (and the Federal Act too) require(s) compensation to be based on market value. For this purpose, market value is defined as "the amount that the land might be expected to realize if sold in the open market by a willing seller to a willing buyer."

In addition to Market Value, an expropriated owner may be entitled to: damages attributable to disturbance; damages for injurious affection; and damages attributable to any special difficulties of relocation.

It is also spelled out that injurious affection means a reduction in value to remaining land arising out of the acquisition or construction of the works or the use of the land acquired, and also personal or business damages resulting from the construction of the works, or the use of the land expropriated. And to conclude this brief summary of Ontario Expropriation Law, an Expropriation Authority also has to pay damages for injurious affection if it occurs, even though no land is taken from an owner. In this regard, however, the onus is on the owner to establish and prove injurious affection.

The Ontario Act also spells out that when part of the land of an owner is taken, and when such part would not in itself be normally a marketable parcel of land, then the compensation shall be measured by the difference between the value of the owner's property "before" the taking, and the value of the owner's interest "after" the taking. It is not difficult to see that this

provision is likely to apply to the appraisal of nearly all rights-of-way, easements or rights-of-way in the nature of easements. (Keep in mind, of course, that I am speaking of the valuation of land being acquired from a private owner, and not the valuation of a strip of land already used for an easement or right-of-way.

My purpose in outlining the above requirements is that these requirements must also be kept in mind by an appraiser or negotiator during negotiations conducted under the "Cloud of Expropriation."

Easement Document — Terms And Conditions

In the valuation of compensation for the acquisition of an easement, or of a right-of-way in the nature of an easement, it is of the utmost importance that full consideration be given to the actual terms and conditions to be incorporated into the easement document. I find it strange that this often gets overlooked at the negotiation stage, in spite of the fact that restrictions will almost certainly be imposed on the use of the land afterwards. Keep in mind that there will be two land uses to consider.

First, the uses by the authority acquiring the easement. Usually this is fairly obvious and will include not only the use for the construction of the undertaking but also the right to enter on the land for the maintenance of the works, or for the reconstruction of the works. Nevertheless, the rights of the acquiring authority should be studied, since these constitute the "bundle" to be acquired and priced or valued.

Second are the uses or rights remaining to the owner of the fee. In most cases, these will be written into the easement document in a negative manner. In other words, the owner will retain his former rights except for those rights that he will convey, and subject to a number of things that he will be asked to covenant not to do - e.g. not to construct a building on the easement land; not to grow trees thereon; not to change the contours without agreement, and so on. These again are rights which he is giving up.

In some cases, and these are exceptions to the general rule, the owner may demand, and the acquiring authority accept, special conditions that will merit consideration in the valuation. For example, I have come across cases where a land owner (a quasi-governmental body) insisted that there be a provision in the easement document, whereby, should the grantor at some future date require the use of the land, then the grantee is required to relocate the works at its own expense. In such cases, I submit that the so called "permanent" easement is merely a "licence to occupy," and should be valued as such. It certainly cannot be treated as a permanent easement, since the right to use that particular parcel of land could be of a temporary nature.

Conclusion

Unfortunately, many people in Ontario, and I believe in Canada and the U.S. also, seem to have a fixed idea that land for easements and for rights-of-way should always be valued at 50 percent of the market value of the land over which the easement is being acquired. *I submit to you that this is totally wrong. I submit to you that each individual easement and each individual right-of-way must be looked at as the acquisition of one or more of the rights of the owner. You must consider the value of the bundle of rights owned "before" the taking of the easement; you must consider the nature and value of the rights removed from the bundle; and you must consider the value of the bundle of rights remaining "after" the taking. The difference between the "before" and "after" valuations should in most cases, equate to the value of the easement or right-of-way.*

I submit to you that the damages caused by the taking could vary anywhere from a low of 10 percent to a high of 90 percent. Each problem must be studied as an individual problem, and each problem must be examined in the light of all the facts and circumstances.



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"THE MOLDING OF RIGHT-OF-WAY APPRAISERS"

By JACK K. MANN, M.A.I.

My topic "The Molding of Right-of-Way Appraisers" would seem to intimate there is something special about appraising for purposes of acquisition of rights of way and I believe that IS the case. In the first place, there is nearly always the power of eminent domain proceedings in the background to be employed in the event normal buy and sell negotiations fail. To me, the laws permitting and regulating the right to expropriate private property for the benefit of the general public involves a public trust. It follows then that everyone connected with such an action — including the Appraiser — maybe even most PARTICULARLY the Appraiser, is under a special mandate to perform in a professional manner.

Secondly, there usually are many more technical and legal considerations involved in these appraisals than in most. Hopefully, the proposed uniform code on Eminent Domain will help alleviate this problem.

Third, in so many cases the very fountainhead of data we Appraisers normally look to for guidance towards that sometimes nebulous "MARKET VALUE" is either nonexistent or extremely scarce. I refer to market information or sales of highly similar properties. You just don't find sales of 100' strips of land through a timber tract — a subdivision or a farm. And, yet, frequently that's what we must value.

Fourth, unquestionably, there is more "PRESSURE" applied to Appraisers of rights of way — regardless of for whom they are appraising and regardless of the ultimate use of the right-of-way. This, of course, varies from subtle leading by attorneys or principals to blatant offerings of bribes or contingency employment.

The fifth and final reason I conclude that right-of-way appraising is unique is the potential effect it can have on the lives of individuals. You see, I believe primarily in divine laws — one of the most basic of which is the divine origin of man. And if man's origin is divine, his rights should be inalienable, his well-being paramount during his life on earth.

I'm thinking of specific instances in which individuals — particularly those in the autumn of their lives, who have been inconvenienced, uprooted and dispossessed by the necessity of rights of way through

their properties. This is necessary — I don't question that but it's also a fact and is evidence of the necessity of the right-of-way Appraiser to be a humanitarian — not in connection with his value conclusion, but, insofar as his contacts with these people.

So I say, yes — appraising for acquisition rights of way IS unique and requires attributes usually not required in other areas of appraising. Add this to the fact that all appraising is becoming more complicated. That, in fact, owning, buying, selling, managing and mortgaging property is becoming increasingly complex — and we have ample justification for the statement that an individual must be “molded” into an acceptable right-of-way appraiser.

What is the process? Let's take the example of a bright young person of say, 18, who has decided his goal in life is to be a professional Appraiser and to specialize in the right-of-way field. Candidly, I doubt very seriously this is ever a stated or recognized goal. Seldom can we be so definitive in our life's goals — but let's say we have an unusual person — male or female — black, red, yellow or white — who chooses this goal. What steps must he or she take toward this achievement?

At the outset let me admit I do not consider myself as having achieved such a goal. I don't consider myself an accomplished professional right-of-way appraiser. I'm simply too emotional when it comes to individual rights. I'm not a particularly good witness because I get nervous — I really don't enjoy the challenge of matching wits with the opposing attorney — and I could name a few other nonattributes!! That's the reason I've hung up my calculator. I personally don't accept right-of-way appraisal assignments. However, over the past 27 years I have served my time — including many hours in the witness chair. So I do have credentials for suggesting that which follows:

I would divide the “molding process” into four primary stages.

FIRST, is the acquisition of basic knowledge of real estate principles. This can be in the form of formal education — typically at the college level — or adult education programs. These are available in nearly all communities through extension courses or night courses. Real Estate is a product that, in both obvious and subtle ways, is different from other products. It is inextricably tied to the physical, social, governmental and economic forces which act and interact constantly and continually. A “good” Appraiser is like a “good” doctor — he or she is constantly looking at symptoms and relating them to “norms.” In this way, the “well-being” of neighborhoods, cities and areas can be identified as well as potential or existing illnesses of those same localities. The ability to identify, recognize, and diagnose the results of the interplay of these forces is absolutely essential to an accomplished

Appraiser. The major deficiency in some Appraisers today is their lack of acquired knowledge in this basic area.

SECOND — is to learn basic appraisal techniques. Principles and Techniques are not the same. Principles are underlying — they are foundational. Techniques consist of the structure erected on the foundation of basic principles. Techniques permit innovation, experimentation, interpretation. But the true test of validity of any technique is that neither the procedure or the results must conflict with basic principles. Have you ever considered that a major factor contributing to a person's inability to cope with life is that person's lack of basic principles in which he or she has complete trust and against which can be compared and “tested” different techniques of living? Think about that.

How does one acquire knowledge of proper appraisal techniques? Fortunately, today there are many opportunities. Personally, I believe there is merit in the educational activities of the professional appraisal organizations. I believe there are plus factors accruing to the student when he attends courses taught by practicing Appraisers who can relate success and failure from personal experiences. I also fervently hope that some day we shall see a nonprofit educational foundation facility to serve the entire profession so that the appraisal organizations can stop competing with each other in this area.

It is in this area that we have seen the most change in the past 10 years and, unquestionably, will see the greatest change in the next 10.

To understand this metamorphosis of appraisal techniques, we have to look back into the history of formalized appraisal procedure. We can get a better understanding of this metamorphosis if we recognize the simplicity of real estate transactions back in the twenties and thirties compared with their complexities in the sixties and seventies. The forties and fifties were transitional periods. It's interesting to note, once again, the inherent difference between basic principles and operational techniques. The former (principles) are identified and postulated by observers.

Observation is, and always will be, a science. There are those with talents in this area who, over a period of time, observe economic phenomena and record the results which, when they are repeated with sufficient “sameness” evolve into basic principles. “Techniques” on the other hand do not have their genesis in observation, but, rather, in innovative, and even speculative thinking and subsequent “testing” in light of basic principles.

So, over the years, there have been “championed” a series of appraisal techniques which actually have been appropriate for the period in which they were in vogue. Primarily, because they provided workable techniques to reflect the value conclusions of buyers

and sellers in the marketplace in a particular era.

Rather than trace all of these popular techniques over the past 50 years, I will restrict this discussion to the two decades of the sixties and the seventies.

In the late fifties, the two almost sacred techniques were "the three approaches to value" and the "residual capitalization techniques." And, actually, in the late forties and the early fifties when acquisition and disposal of real estate was relatively simple, these techniques were more or less appropriate.

Then, more capital was diverted from other investment opportunities into real estate. This triggered more sophisticated and complicated approaches to financing, which, of course, resulted in more complicated transfers of real estate.

So, as a result, the old techniques were questioned. And, as is almost always the case — new techniques were proposed and, eventually, accepted. The most innovative and provocative was Pete Ellwood's Mortgage-Equity Capitalization Technique. Reduced to simple terms, Pete's Technique — tested, incidentally, probably more than most "wonder drugs" prior to marketing, involves an overall capitalization rate in the Income Approach to Value. This rate converts expected future income into a present value employing previous techniques of "RETURN ON" and "RETURN OF" invested capital; but cranking in the effect of both mortgage amortization and forecasted change in value during ownership. This concept, while apparently complex on the surface, is so simple in both application and proof as to defy contradiction — WHEN USED PROPERLY.

Simultaneously with the acceptance of the mortgage-equity capitalization technique was a questioning of the necessity of ALWAYS — in EVERY CASE — applying all THREE classical approaches to value. In the 40's and 50's this would have been heresy!! No more. I emphasize this to highlight the changes that may well occur in the future. Already, we are experiencing the effect of the use of computers on our appraisal techniques — not as a valuation tool but as a "trial and error" testing device of raw market data and hypothetical alternatives.

The third phase of "molding" which conceivably could occur simultaneously with Phase Two is gaining practical experience. Typically, this is the most difficult phase upon which to embark. We desperately need some type of formal internship such as is available in the medical profession or at least an apprenticeship such as is available in some of the building trades. This has been talked about in many of our appraisal organizations but, so far, we have no formal program that I know of. Experience is essential. I should say "proper" experience is essential because there are neophytes today who are gaining the wrong kind of experience through association with incompetent appraisers. A good apprenticeship or internship

is not necessarily an easy one. I know. My brother trained me. He was the second M.A.I. in our State. He was competent. He was technically proficient. He was conscientious and he was and is extremely honest and ethical. How many times he rejected my first effort. How many times he said "You didn't check this or that — you can do better." And how glad I am today he did that. And you can ask my boys in our Appraisal Department today — how many of their reports I accept without comment, change or correction. Yes, it's hard! Very little that is genuinely good comes easy — in life or business.

The final phase in the molding process is the recognition and acceptance of honesty as a cardinal principle and a way of life. This, of course, involves ethical conduct. What good is knowledge and complete understanding of basic principles and acceptable techniques — what good is a wealth of proper experience if we then apply principles, techniques and experience in an unethical manner? What is ethical conduct? Simply living the golden rule. "Do unto others as you would have them do unto you." That says it all. Honesty, truthfulness, righteousness, all of that is simply obedient compliance with God's divine laws. Our real problem comes in "INTERPRETATION." We want to interpret what is ethical conduct in others but we're not always willing to apply that same interpretation in ourselves. That and DEGREE. How many times do we say to ourselves — "well, maybe I WAS a little off base there — but compared with most . . ." If we're honest, we will realize we can't be a "little ethical." We either are or we aren't.

To recapitulate, I envision our young friend — or old friend — for that matter — setting forth first to acquire through some formal education, knowledge of basic principles of real estate and acceptable techniques of appraising. Then applying that knowledge in a training program of proper experience. Finally, he or she would be ready to take on the primary responsibility for assignments and accept the challenge of complete ethical conduct. The learning phase is limited in initial comprehension but continues throughout the active life of the Appraiser. How many Appraisers do you know who absolutely refuse to update their appraisal knowledge? Far too many. They sit on their designations and do irreparable harm to the profession through their out-moded ineptness.

Speaking of "out-moded" it is becoming increasingly obvious that we MUST continue to update our appraisal techniques. I mentioned earlier the increasing use of the computer in both analysis and forecast. I'm warning all Appraisers — you had better get acquainted with this tool. Its use will be intensified soon. And if you don't update your knowledge in this area, I'm afraid your "20 years experience and white hair" is not going to suffice to keep those assignments coming in!!

Easement Valuation

With the ever-expanding Barnett Shale gas field in North Central Texas, the valuation of easements places an increasing demand on appraisers to correctly evaluate pipeline easements and their impact on market value. This treatise is not limited to gas pipelines but is an attempt to provide some thought on how to value easements in general. The valuation of easements requires knowledge of a wide variety of market factors and a look at the rights included in the easement document.

BY DONALD SHERWOOD, SR/WA

First, what is an easement? According to the Dictionary of Real Estate Appraisal, an easement is the “conveyance of certain property rights, but not ownership, to a parcel of real estate.” By definition, the ownership of real estate is endowed with a bundle of rights. The concept of bundle of rights maintains that like a bundle of sticks, real property ownership may be wholly intact (fee simple estate) or may be conveyed in part to a third party.

In real property ownership, one has the inherent right to use the property, to sell it, to lease it, to enter upon it, to give it away or the right to refuse to do any of these things. For example, the creation of a lease conveys to the tenant a portion of one’s rights for the specific term and space occupied by the tenant according to the terms of the lease. During the lease period, the tenant may have a measurable interest in the property (leasehold estate). The creation of an easement is somewhat similar in that we are dealing with concepts of time and space. By definition, the creation of an easement conveys a portion of the total bundle of rights to a third party. The challenge before the appraiser is the measurement in terms of dollars of the market value of the rights conveyed.

With respect to time, easements may be either permanent or temporary in nature, with either specific or indefinite time frames. One of the most common temporary easements is a temporary construction easement (TCE). This type of easement is generally used to facilitate construction of a project and either terminates at the end of construction or at the end of a specific use period. For example, a 25-foot-wide permanent easement may not provide ample space for construction. An additional 15 feet may be needed for the actual construction and would be acquired as a temporary construction easement.

CLASSES OF EASEMENT

In terms of space, three broad classes of easements exist and include subsurface, surface and overhead easements. Subsurface easements may be required for the construction of water and sewer lines, gas pipelines, communication lines, or tunnels. During construction, surface disturbance may occur and some above ground appurtenances may be present, however the bulk of the project remains below the surface and is unseen. Common surface

easements may allow for drainage, flowage, railroads and highways. These types of easements severely impact the surface area. Typical overhead easements include electrical transmission lines and aviation easements. Some easements may involve two or even all three of these types of space. For example, overhead transmission lines require surface areas for the placement of the towers and some subsurface areas may be needed for the underground footings required. Thus, while generally classified as one of these three broad classes of easements, most easements involve multi-space occupancy.

The task before the appraiser is to evaluate the “rights conveyed” by the creation of the easement and to properly measure these rights. The principles and techniques applied to appraising property for partial acquisitions apply to the valuation of an easement. Under the federal rule, the value of the easement will be based on the difference between the value of the whole property before (or without) the easement and the value of the property with the easement in place.

In this example, the \$60,000 of total compensation includes the value of the easement and any damages that may result due to the placement of the easement.

Value of Whole Property Before	
120 acres @ \$10,000 per acre	\$1,200,000
Value of Whole Property After	
120 acres @ \$9,500 per acre (Encumbered with 10 acres in easement)	\$1,140,000
Total Compensation	\$ 60,000

Under the state rule, the appraiser will be required to estimate the value of the easement plus damages to the remainder, if any. For example:

Value of Whole Property	
120 acres @ \$10,000 per acre	\$1,200,000
Value of the Part Acquired	
10 acres in easement @ \$10,000 per acre @ 50%	\$50,000
Value of the Remainder Before the Acquisition	
\$1,200,000 - \$50,000	\$1,150,000
Value of the Remainder After the Acquisition	
\$1,200,000 @ \$9,500 per acre (Encumbered with 10 acres in easement)	\$1,140,000
Damages	\$10,000
Total Compensation	\$60,000

“ ... the mere presence of an easement is not generally the deciding factor in a purchasing decision. ”

Where do these figures come from? The answer: the market! The appraiser’s task is to see what effect, if any, an easement has on the sale of property encumbered with similar easements. In the case of residential property, most urban properties within platted single family subdivisions are likely encumbered with common utility easements. In most situations, these easements extend along the property boundary and have little effect, if any, on the sale of the home. Thus, the market tells us that the easement has little value, if any. Why? The presence of the easement does not affect the use or utility of the property. The easement does not place any undue burden or hardship on the ownership.

Using the illustration below, assume that the 120-acre ownership will be encumbered with 10 acres in permanent easement; however a “gap” exists between the easement and the north property line. The use and utility of this “severed” area is limited given its narrow shape and size. The following is an illustration of this example.



The total effect of this easement can be measured by looking at actual market sales unencumbered with similar easements. Finding encumbered sales can be an extensive exercise requiring lots of time and manpower. While it is highly unlikely that the market will produce an exact situation, it may be possible to find sales encumbered with an easement and compared to a sale unencumbered. This is often referred to as “matched pair sale analysis.”

In our local market, we have investigated sales encumbered with gas pipelines and compared them to similar sales encumbered. By nature, the real estate market is a very imperfect market and no two sales are identical. However, by gathering a sufficient number of matched pairs, general trends may emerge that give some market evidence of the effect easements have on value. Our analysis indicates the following trends as outlined below:

PAIRED ANALYSIS SUMMARY

Sales	Dates	Land Sizes (Acres)	Pipeline Size	Price Differential
A-1	9/27/01	5.78	None	-2.4%
A-2	4/30/01	5.73	16"	
B-1	5/29/02	38.427	None	+1.5%
B-2	7/18/02	25.5	16"	
C-1	9/4/01	16.39	None	+44.0%
C-2	12/6/01	15.68	12"	
D-1	8/13/01	101.27	None	-2.1%
D-2	7/12/01	97.92	18"	
E-1	8/26/02	5.0	None	-27.6%
E-2	5/30/02	5.0	20"	
F-1	7/31/02	12.551	None	+6.4%
F-2	8/27/02	14.56	10"	
G-1	6/11/01	29.87	None	-6.5%
G-2	3/8/01	48.318	20"	
H-1	5/29/02	9.81	None	-9.1%
H-2	5/24/01	10.0	16"	
I-1	9/20/00	7.31	None	-1.9%
I-2	2/12/01	10.79	16"	
J-1	1/18/01	112.723	None	+0.1%
J-2	2/1/00	139.09	10"	
K-1	12/14/01	12.665	None	+8.1%
K-2	12/30/02	27.29	24"	
L-1	10/25/02	10.0	None	-5.7%
L-2	11/6/02	15.0	10"	
M-1	7/10/03	14.34	None	0%
M-2	5/20/03	20.48	10"	

Often the market is unclear as to the effect an easement will have on value. Market participants (buyers, sellers, brokers, other appraisers) may offer insight into their personal opinions as to the effect an easement may have on value. In the absence of market data, some appraisers use market surveys of buyers, sellers and brokers to support their opinions. For example, a broker may offer an opinion that a particular property is discounted 5% due to the presence of the easement. This would, at first blush, seem to have a minimal effect on the value. However, some appraisers take such information and apply it inappropriately. Basically, this error results in an overstatement of the effect of the easement may have on value. Using the same example cited above, the appraiser incorrectly assesses the impact as 5% damages to the value of the remainder

property plus the value of the easement. The results are as follows:

Value of Whole Property 120 acres @ \$10,000 per acre	\$1,200,000
Value of the Part Acquired 10 acres in Easement @ \$10,000 per acre @ 50%	\$50,000
Value of the Remainder Before the Acquisition \$1,200,000 - \$50,000	\$1,150,000
Value of the Remainder After the Acquisition	\$1,092,500
Damages	\$57,500
Total Compensation	\$107,500

What the broker stated was that the property would command 5% less than the property's unencumbered value. Assuming the unencumbered value was \$1,200,000, then the total damages would be 5% or \$60,000, resulting in a remainder after value of \$1,140,000. The \$60,000 includes both the value of the easement plus any damages. What the appraiser has done in the above calculations is provided double compensation, \$50,000 for the easement plus \$57,500 in damages. As you can imagine, this error is compounded when the estimate of damages rises to 10% or 20%, as opposed to the 5% estimate.

When investigating a new easement, some important questions should be addressed by the appraiser. It is imperative that the appraiser understand the nature of both the legal and physical rights that are being sought. Some questions may include:

- What is the proposed use?
- Where is the easement located? Can it be moved?
- Is the easement located in a setback area or along a property line?
- What will be the construction? (open cut versus bored)
- Who will maintain the property during construction?
- Will the easement be surveyed and monumented?
- May either party alter the construction or grade after completion?
- Will the landowner have to obtain permission to use the easement area?
- Can the landowner cross the easement with roads, utilities, etc.?
- Who pays property taxes and insurance?
- Will the easement cause a loss in view, security, etc.?
- Will the easement provide any benefit to the owner?

These issues are often found within the easement document but may require discussions with the condemnor. In terms of legal encumbrance, it is important to recognize that the easement will impact the ownership title and may affect both current and/or future uses.

One key question is “will the easement affect the use and/or utility of the property that results in a change in highest and best use?” Also, the easement may include accessory rights such as the ability to access the easement and ability to expand the use within the easement (add additional pipes). From a physical standpoint, it should be recognized that most of our activity occurs on the surface. Thus, impacting the surface area tends to affect value to a greater degree compared to a subsurface easement where there is little or no impact on surface use. The appraiser thus needs to know how the easement is intended to be used and how it will be constructed.

“... will the easement affect the use and/or utility of the property that results in a change in highest and best use?”

Damages or the percentage of rights acquired are often difficult to measure due to the imperfections in the real estate market and due to the fact that the presence of an easement represents only one of many factors affecting the buying decision.

While some buyers may react negatively toward a particular easement, others may view the same property with total disregard toward the easement. Other factors such as location or the presence of some amenity may overshadow the presence of the easement resulting in little discount, if any.

The Easement Valuation Matrix (left) is used as a general guide in looking at the effect an easement may have on the total bundle of rights. This chart should not be considered an exclusive list as to the type of easements and their effect on the total bundle of rights but should be used only as a guide to general effects on the total fee ownership.

IN SUMMARY

My experience in the valuation of real property leads me to the conclusion that mere presence of an easement is not generally the deciding factor in a purchasing decision. While I recognize that an easement can cause severe harm to a property, each property and situation should be evaluated on an individual basis.

In general, if the market recognizes the presence of an easement as a major adjustment factor, it is likely that market participants would more readily address these concerns when appraisers verify market data.

This is not to say that damages do not occur in the market due to the presence of an easement. Each situation must be reviewed on an individual basis and evaluated using market evidence as opposed to speculation and guesswork. ■

EASEMENT VALUATION MATRIX

Percentage of Fee	Comments	Potential Types of Easements
90% - 100%	Severe impact on surface use Conveyance of future uses	Overhead electric Flowage easements Railroad ROW Irrigation canals Access roads
75% - 89%	Major impact on surface use Conveyance of future uses	Pipelines Drainage easements Flowage easements
51% - 74%	Some impact on surface use Conveyance of ingress/egress rights	Pipelines Scenic easements
50%	Balanced use by both owner and easement holder	Water or sewer lines Cable line Telecommunications
26% - 49%	Location along a property line, location across non usable land area	Water or sewer line Cable lines
11% - 25%	Subsurface or air rights that have minimal effect on use and utility Location with a setback	Air rights Water or sewer line
0% to 10%	Nominal effect on use and utility	Small subsurface easement

The Appraisal of Easements

By Albert N. Allen, SR/WA

In recent years, the increased level of easement acquisition, particularly by energy and telecommunication companies, has prompted a number of reasons for easement appraisal to include proposed easement acquisition, appraisal of property encumbered with one or more easements, and analysis of property sales already encumbered with easements. This article primarily focuses on easement acquisition across individual properties: the methodology rather than application. The scope of the article also includes some background consisting of definitions, a discussion of proper easement valuation methodology, and finally some comments on misused alternative methodology.



BACKGROUND

A brief discussion of basic terms related to the eminent domain valuation framework will probably prove helpful before addressing easement valuation methodology. There are many excellent sources for valuation-related definitions, and several have been included in the references at the end of this article. No attempt has been made to advance precise definitions in this article, but rather to relate the terms to each other and to show how they fit within the easement valuation framework.

MARKET VALUE — The appraiser should be aware of the market value definition of the particular jurisdiction of the subject property. Any proper definition will include the willing seller/willing buyer concept. The courts are seeking just compensation and market value is generally accepted as a basis for just compensation. When appraising the impact of an easement on a particular property, care should be exercised not to arrive

at a conclusion of value other than market value. Market value is related to the value of the subject property itself (in rem) to typical market participants and not to the individuals or entities (in personam) that own the property.

Examples of other types of value include use value (value particular to the owners of the property) usually associated with a special use property, and investment value (value to the buyer).

HIGHEST AND BEST USE — This is probably the single most important appraisal principle and is fundamental when estimating market value. Land is always appraised based on its highest and best use as theoretically vacant and available for development at the date of the appraisal. The existing (current) use, particularly of improved property, is not necessarily the standard; rather it is the physically possible, appropriately and legally supported, financially feasible, and resulting in

the highest value of the land as of the date of valuation. A potential (future) highest and best use is not the standard used unless that use is reasonably probable. Highest and best use concerns the use of land and not the owners or buyers of property. Business value is outside of the scope of highest and best use.

WHOLE PROPERTY — Sometimes referred to as the entirety, the larger parcel, or the parent tract. Some appraisers distinguish between the three. The term whole property as used in this report means a property under a single ownership, physically contiguous and with one highest and best use throughout. Cases of common ownership, physical contiguity and more than one highest and best use indicate more than one economic unit and thus, more than one whole property. The market value of the whole property places the ceiling on just compensation. That is to say, the market value of a part taken cannot exceed the market value of the whole property, although the taking can result in damages in excess of the market value of the partial acquisition.

PARTIAL ACQUISITION — Also variously referred to as the part taken, take, or partial take. A fee taking involves all of the rights of ownership; however, an easement involves a partial taking of rights, and, in many cases, the interest taking involves but a portion of the total property. Different kinds of partial takings include 1) the fee taking of a part of the total property; 2) an easement taking affecting the total property; and 3) an easement taking of part of the total property.

An easement acquisition is always a partial acquisition. Even if the proposed easement physically covers the entire subject whole property, the underlying fee estate is not acquired. The underlying fee owner still has a beneficial interest in the property. A partial acquisition can involve physical property or legal rights (such as access rights), or both. The appraisal of easements requires identification of the type of easement and the physical parts of the total property affected.

REMAINDER PROPERTY — The remainder property includes those portions of the total property not taken plus the property rights remaining to the owners of the easement area itself. For example, a pipeline easement across a farm will leave the landowner with land areas not within the easement, plus the right to use the surface area of the easement area after construction for crops. As a result of some easement acquisitions, the remainder property may have a different highest and best use than that of the original whole property.

RIGHT OF WAY — As used in this article, right of way will refer to the area within the boundaries of the easement in which the utility, pipeline, or telecommunication facility is installed. For example, the pipeline right of way width may be 50 feet. A right of way may be across a particular property. A right of way can also be a route across many different properties, as in the case of a pipeline or a fiber optic line. A right

of way can also include fee simple property. A right of way should not be confused with an easement. In most cases, a right of way will cross multiple properties and will consist of several easements. An easement is unique to one property. Both terms, as they relate to the subject property, should be discussed within the appraisal report. Another common mistake is to confuse a right of way with a corridor. A corridor is always a right of way, but a right of way is not necessarily a corridor. Corridors are discussed later in this article.

EASEMENT — An easement is a specifically defined interest (estate) in property and is owned by someone other than the owner of the underlying fee simple interest. It is a dominant estate and the underlying fee is a servient estate. The easement document specifically delineates what property rights are involved and should be included in the appraisal report. No two easements are exactly alike. Each easement is associated with a particular property and is unique from other easements on that property and to easements situated on other properties. Easements are not a type of highest and best use. An individual easement is not a right of way system or corridor.

USER IMPROVEMENTS — These are the physical improvements or structures placed within the right of way such as a pipeline, electric transmission line, telecommunications cable, etc. This facility may be situated on a single property or may extend across many separate properties.

The user improvements in easement areas are owned and operated by someone other than the underlying fee owner. Any value, cost, profit or revenue from operation of the user improvements goes to its owner and not to the underlying fee owner. Revenue from operating the infrastructure is a business venture separate from the value of the land burdened by an easement.

PROJECT INFLUENCE — In the partial taking of a right of way for a given project, the purpose of the project and

the proposed user improvements can impact the value of the remainder property. It can lower the value of the remainder (damage), raise the value (benefit), or have no impact on the remainder value. The project influence rule says that any impact on value affects only the remainder and should not be considered when appraising the whole property value. Valuation of the whole property and the partial acquisition is estimated before considering the project influence. The remainder property is valued after considering the impact of the project.

CORRIDOR — Corridors should not be confused with easements. A corridor is a property use rather than an estate. Stated another way, a corridor is a type of highest and best use, while an easement is generally an estate or interest in land. A highest and best use as a corridor is market driven as opposed to an arbitrary delineation, and the reasonable probability of users is necessary.

In the valuation of easements for public acquisition, the measure of value is always the loss in the value of the burdened property, not the value of the easement to the taker.



Rights of way across an individual property are typically in the form of an easement; however, the user may own in fee some portions in a given length of right of way (across multiple properties). Only when the land across a given length of right of way is in the absolute control of a one entity, may the length be defined as a right of way corridor (and this assumes that other tests are met as well). In some circumstances, the individual existing rights of way easements are not in the control of an individual entity, and changes and sale of the corridor for additional users is not possible without the additional consent of the individual owners of the underlying fee simple estate. For example, if a railroad is situated within a physical corridor but owns only the right to use as a railroad, and the individual fee owners control other uses (such as laying a pipeline or fiber optic line), then that right of way cannot be defined as a marketable corridor in an economic sense.

A corridor has a number of characteristics. Any corridor connects important demand points while an easement extends to the boundaries of only one property. A corridor avoids congestion to the extent that it bypasses many properties, allowing a user to avoid buying right of way from many different owners. That is to say a corridor provides a distance advantage due to transport across many ownerships. The corridor owners provide services such as engineering, maintenance and surveillance. Corridors are typically marketed as an entity.

Owners of corridors rent or sell right of way within the corridor to users who wish to place their user improvements within it. However, the physical corridor is not classified as a right of way corridor unless the rights to use can be obtained from a single entity without the necessity of getting also the same rights from all the basic fee owners of the land. There is considerable literature on the subject of corridor valuation and some has been included in the bibliography.

VALUATION CONSIDERATIONS

The proper valuation methodology for easements is the "before and after" rule. A variation of this rule is the "take plus damages" rule. Generally, case law and appraisal literature support this methodology. Strictly speaking, the appraiser does not appraise an easement but rather measures the impact of the easement on the burdened property. The measure and impact (value) of an easement is the loss in

value to the remainder property after imposition of the easement. This diminution is comprised of both the easement acquisition and damage (if any) to the remainder. Different jurisdictions have different laws governing the valuation of partial takings and the appraiser should be careful to use that methodology applicable in the subject property's jurisdiction.

In the valuation of easements for public acquisition, the measure of value is always the loss in the value of the burdened property, not the value of the easement to the taker. Appraisal methodology is focused on the market value of the property and should be consistently applied. The valuation methodology used should not vary regardless of the nature of the proposed project, who the buyers will be, or who the owner is. Additionally, it should not vary whether a governmental agency is involved or if it takes place in the private sector.

VALUATION OF THE WHOLE PROPERTY — The whole property is appraised before any consideration of the proposed project. The whole property is not burdened by the proposed project in the before scenario and the market data collected for the whole property value estimate should not reflect any project influence.

VALUATION OF THE PARTIAL ACQUISITION — The proposed acquisition area to be burdened by the easement is appraised in the before situation and will have the same per unit value as that of the whole property. All easement acquisitions are partial

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acquisitions because some beneficial interest remains with the underlying fee owner. Accordingly, the value of the proposed easement impact on the remainder will be less than the value of the fee simple that it burdens, and cannot be more. The market value of the easement acquisition is directly related to the market value of the property it burdens. If the purchase price of an easement exceeds that of the underlying fee simple value, this is an indication of the presence of other considerations, such as damages to the remainder, business decisions, time restraints, administrative settlements, improvements within the acquisition area, unusual physical characteristics, engineering factors, etc. If the area of the proposed easement were worth more on a per unit basis than the value of the fee simple estate, then it would follow the properties burdened with easements would sell for more than properties having no easements. The market does not bear this out.

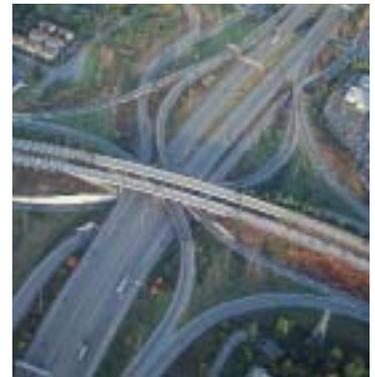
VALUATION OF THE REMAINDER — The remainder is appraised in the after scenario because it is now burdened with the easement. The remainder consists of all property outside of the acquisition area and the underlying fee simple interest. Paired sales analysis is the proper way to measure the impact of the easement. By comparing properties similar to the subject with an easement to similar properties without an easement, an estimate of the differences can be abstracted.

TOTAL BEFORE AND AFTER METHOD — When the law of the subject property's jurisdiction requires a before and after valuation, the appraiser performs an appraisal of the property before considering the impact of the take and the project. Next a new appraisal is made of the remainder property under the theoretical assumption that the proposed project has been completed. The appraiser takes into account in the after value the impact upon value of the use of the easement area by the project and the benefits of the easement area remaining to the underlying fee owner. Also taken into consideration is the impact on the

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remainder of the taking. Sales of properties burdened by a similar easement are compared with similar properties not affected by the same type of easement.

ALTERNATIVE METHODOLOGIES

On occasion valuation methodologies other than the “before and after” method are advocated both in practice and in appraisal literature. These alternative methodologies have arisen in part from the hectic nature of utility right of way (telephone, electricity, pipeline, fiber optic, etc.) acquisitions in recent years and some have serious flaws. Three of these alternative methods will be discussed: use of easement transactions as comparables, linear rules of thumb, and incorrect use of corridor valuation theory.

EASEMENT TRANSACTIONS COMPARABLES — Generally speaking, easement transactions are not reliable for use as comparable data and should not be used when appraising the impact of an easement on the burdened property. Even though the use of easement transactions seems very straight forward, there are a number of reasons why they should not be used to estimate market value.

Easements are not economic units in and of themselves. An economic unit must stand alone on its own. They are not traded individually on the open market. A user purchases easements in order to assemble a system and most easement transactions represent gain to the buyer as opposed to loss in value to the burdened property. Because the buyer is putting together a right of way system, many non-realty considerations could be involved in an easement transaction including administrative costs, engineering factors, project timing and other business decisions. For example, a natural gas supplier facing a contractual deadline might pay an inflated price for a particular easement in order to complete the project. Another example would be when valuing partial acquisitions for a road-widening project; sales of strips of land to the condemnor on other road projects are not used as comparable sales. The appraisal methodology should be consistent regardless of the type of project.

For some types of easements, such as those acquired by utility companies for electric, telephone, cable lines and pipelines, there may be an established going rate per pole, per line-mile, per rod, and the like. In appraising a similar type of easement for government acquisitions, the appraisal should not be based on such going rates but should be based

upon the usual “before and after” appraisal method. It therefore goes without saying that sales of easements based on such measures cannot be considered valid comparable sales.

The use of easement sales introduces project influence (an after scenario) to the before valuation. Any valuation of an easement impact should be in the after situation. In the before scenario, there is no easement. Using easement transactions as comparables might indicate a pre-determined opinion that the proposed easement area represents an economic unit (separate highest and best use). The probability of an easement being placed on a particular property at the precise location across the property in anticipation of a project in the future is probably remote. Accordingly, the reasonable probability component of highest and best use is violated.

Easement transactions are complex and obtaining all of the information necessary to make a direct comparison to the subject easement is extremely difficult. Confirmation by the appraiser of the amounts paid for each easement along a right of way project is very difficult. Even if the sales prices are available, identifying and abstracting the various components of each transaction such as land value, damages to the remainder, business decision, etc. are hard to obtain. Accordingly, the comparison is usually unreliable.

Each burdened property is unique. An easement across one property will probably reflect a different impact when compared to the impact of an easement acquisition on the subject property. For example, there may have been improvements within the easement areas of one easement sale and none in the subject easement area. There may be damages to the remainder as a result of the easement on one property and no damages to the remainder on the subject property. The highest and best use of one property may be different than that of the subject whole property.

Each easement is unique. For example, one easement may involve a 50-foot right of way compared to only 30-feet for the subject easement. Another easement may extend diagonally across one property unlike the subject easement that may extend along the property boundary. One easement may have a term of ten years while the subject easement may have an indefinite term.

Each user improvement is unique. The size of the pipeline, the number of pipelines allowed, the product, etc. all may differ between one easement transaction and the facility to be built on the subject easement area. These

differences are important because the potential for damages to the respective remainders may differ between the easement transactions used for a comparable and the subject easement.

Each purchase is unique to that buyer. It is difficult to compare a transaction involving one buyer with a particular set of needs and objectives to another situation involving another buyer with a different scenario of potential gain.

The most compelling reason that the prices paid for rights of way should not be the basis of establishing market value of an easement is that such acquisitions are not made by a willing buyer and willing seller. The utility or pipeline company is a forced buyer and the sellers are under the threat of condemnation. Even if the purchaser does not have the power of eminent domain, they are still a forced buyer. Such sales do not represent open market value.

LINEAR RULES OF THUMB — Although in practice, easement purchases are often made based on linear units of value such as, per rod, per mile, per foot, etc., this is not appropriate appraisal methodology. As pointed out earlier, each easement is quite unique and a linear measurement (per unit expression of value) does not take into account the differences between properties. An easement across an individual property is only one component of a right of way project that may extend for many miles across dozens, if not hundreds, of individual properties. Often the linear measurement represents value to the buyer. To the extent that the buyer is assembling a right of way system, prices paid for individual easements may reflect a business decision rather than a market value decision. Accordingly, the linear measurement will usually represent a use value such as investment value, rather than market value.

IMPROPER USE OF CORRIDOR THEORY — In those cases where highways, pipelines, electric transmission lines extend from one point to another, there obviously exists a physical corridor. The user of the land areas in the physical corridor may own fee title to the lands in the right of way, for example, the state highway department. In such cases, the land from one point to another is a true, saleable or rentable right of way corridor providing the user the right to sell or lease rights to others to place their improvements, such as a coaxial cable, in the corridor. In some cases, the land was acquired from the landowners for the sole purpose of the highway and the state may not have the right to sell or lease the restricted corridor to others.

There are instances where railroads, with fee title to the right of way, abandon their service to a particular right of way and then sell or lease the land to others. Roads owned in fee may be undedicated and the fee lands become available for sale or lease to others. Frequently, there is no demand for the rights of way abandoned by the utility or railroad and the land is divided and sold (where possible) to the adjacent owners. Where railroads own the fee title to their right of way, they may be able to lease or sell portions of the right of way to others such as a pipeline. Interstate highways probably are the largest supply of true, merchantable corridors.

The methodology of appraising true, saleable right of way corridors depend upon a demand by some entity and the ability of the buyer to pay. When a demand

exists, the lower limit of value typically is the across the fence unit value adjusted down for the property rights retained by the seller. The upper limit is usually the across the fence land value sometimes including an increment (usually a multiple) above the across the fence land value as adjusted for plottage.

When the ownership and control of additional usage of a physical right of way is vested in a number of landowners in addition to the easement holder for the original use, there is no merchantable right of way corridor. It is improper to use the "corridor concept" in those cases of physical corridors since there is no savings of time and expense. The existing landowners may even demand more compensation than owners in a new right of way.

The attempt to place a "corridor" premium on proposed individual easements because they are a part of or adjacent to an existing right of way, by classifying it as "corridor value" is incorrect. Several courts have confirmed this.

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SUMMARY

In the final analysis, the traditional, land-based, before and after methodology is the best measure of the impact of an easement on a particular piece of property. If market value is being sought, then the impact on the value of the property and not gain to a buyer (whether individual or entity) is the appropriate measure. To use other techniques will almost invariably lead to an estimate of some value other than market value. This is a particularly important consideration in the eminent domain framework.

The market value of easements does not relate to the value to the user. The "use" of highest and best use is the economic use of the property without regard to the benefits to the condemner. Typically, the partial acquisition may involve specifically defined interest over the total property, such as an aviation easement covering the entire property; or, it may involve certain rights to merely part of the whole property, such as a driveway access.

The market value of a corridor can be totally owned in fee by a single

entity, such as a railroad or state highway, or, the physical corridor can be a number of parcels with the underlying fee owned by individual property owners. There may be a plottage increment above the "across the fence" value when portions of the total corridor can be sold or rented to others by a single owner; however, there is no rationale for a value increment when every property in the corridor must be acquired from the individual owners.

In the direct sales comparison approach, transactions involving rights of way acquired by others are not considered valid because they are not open market transactions. Such acquisitions are by a condemner forced to acquire and by a condemnee forced to sell under the threat of eminent domain. The price per rod, per acre, or per mile under these conditions is not bona fide data that can be used to arrive at market value.

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Ten Courtroom

Commandments for Appraisers

by JOHN P. HORGAN

MEMBER OF THE SAN FRANCISCO BAR

If you are an appraiser or ever hope to be one, or if you ever expect to take the witness stand as an expert on valuation, you might pause here a moment before turning to the want ad section. What you will read here probably will not please you. If that should prove to be your reaction, then the purpose of this piece has indeed been realized.

Let us face the stark fact that the expert witness is in disrepute with both courts and juries and his lowly status is rapidly deteriorating. The expert witness, as we know him, is on trial for his very existence. The public performances of some so-called experts have been so incredible, so distasteful, so unprofessional and, if you please, so morally reprehensible that every expert, ethical and unethical alike, is painfully suspect.

Condemnation trials are increasing in frequency and complexity all over the country and more members of the judiciary are having occasion to come face to face with the phenomenon known as the expert real estate appraiser. The reaction of some of these judges, as we shall all too soon demonstrate, is not of the type which would make prime material for the scrap book you hope to hand down to your descendants. To take a few random samples of these rave notices, hearken to the court in *Ferguson vs. Hubbell* 97 N.Y. 507:

"It is generally safer to take the judgments of unskilled jurors than the opinions of hired and, generally, biased experts."

or, lend an ear to the case of *Roberts vs New York Elevated Railway Co.* where the court inscribes this glowing tribute:

"Expert evidence so-called, or in other words, evidence of the mere opinion of witnesses has been used to such an extent that the evidence given by them has come to be looked upon with great suspicion by both courts and juries and the fact has become very plain that in any case, where opinion evidence is admissible, the particular kind of an opinion desired by any party to the investigation can be readily procured by paying the market price therefor."

Again, in the case of *In Re Board of Water Supply of The City of New York*, 155 N.Y.S. 753, the court characterized two witnesses offered by the owner of property alleged to have been damaged as "expert swearers" and held their opinions to be entirely worthless.

Nichols in his work on Eminent Domain, 3rd ed. Vol. 5, Sec. 18.4(1) makes these observations:

"There has been a widespread and growing distrust of expert witnesses in our courts (*Welch vs Tennessee Valley Authority*, 108 F 2d 95) . . . It has been characterized as 'inconclusive and often tainted' (*Johnson & Wimsatt, Inc. vs Reich-Elderfer* 50 F 2d 336)."

Examples such as these could be expanded almost ad infinitum but the direction of the current of judicial opinion should be clear to the sensitive.

Experience has been showing with increasing frequency that the reaction of juries is closely following that of the courts. Juries, considerably less articulate by reason of their function, can speak volumes through their verdicts. These verdicts have recently reflected the growing mistrust in the expert witness.

About the Author . . .

Jack Horgan is a native of San Francisco being educated at St. Ignatius High School and graduating from the University of San Francisco in 1936. In 1937 he graduated from the Stanford Graduate School of Business. After four years of service with the United States Navy he was discharged in 1946 as a Lt. Commander. In 1947 he received his L.L.B. Degree from the University of San Francisco Law School and was admitted to the Bar in 1947. After a year as Deputy District Attorney for Sacramento County he became associated with the Division of Contracts and Rights of Way of the Department of Public Works of the State of California. Since then he has become a specialist in condemnation trials for the Division of Highways.

In interpreting these verdicts it is clear that juries have come to regard most experts as advocates and not impartial opinion witnesses. The witness who becomes an advocate is worse than useless and his very presence on the stand is a grave threat to his client's case. In such situations there is little that the jury can do except decide the facts for themselves and substitute its own collective knowledge of affairs for the obviously slanted appraisal of the pseudo expert.

The legislative bodies of the states have taken note of this deplorable situation. Some 28 states now have the commission system in one form or another. Juries are thus spared the agony of ferreting out the real facts and the truth from the distorted and equivocal sales pitch of the expert turned hucksters. Indeed, the present session of the California legislature is considering the wisdom of abolishing the jury trial in condemnation cases. Those not in sympathy with the philosophy of this piece can argue many reasons for legislative consideration of abolition of jury trials. Whatever the corollary reasons may be, it is a certainty that the current disfavor of the expert is one of the prime causes for legislative consideration of

this change in procedure. A long line of charlatans parading before juries and turning the courtroom into a hippodrome are about to be disbanded forever. They could never ply their nefarious trade before a sophisticated and knowledgeable commission. Only the skilled and the honest would survive.

There are many who would deplore the end of the jury system in condemnation cases. Is it too late to reverse the trend? Is there any hope that the jury system and the expert witness can live in honest and peaceful co-existence? The chance is slim, but it is still there. Hope here will rest upon an immediate and drastic house and soul cleaning job by reputable appraisal organizations and societies and, what is even more vital, a complete and objective self-analysis by every individual who henceforth will take the stand and qualify as an expert. As a possible aid to this soul searching and self analysis, ten commandments have been formulated which may in some measure guide the analysis and set a pattern for courtroom demeanor. Let those who are smug enough to believe themselves above reproach turn now to other writings more fitting to their ego. Let the honest and the brave read on. The command-

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ments which follow may appear harsh and inflexible. They are just that, for only strong medicine is capable of conquering the stubborn malady.

I—Thou Shalt Not Lie Nor Be Evasive

This injunction would seem almost unnecessary except that some witnesses have falsified and many have been evasive. If moral integrity is lacking there is truly no hope. We deal here with common honesty and decency. Absent these qualities the oath taken by the witness is an empty mockery. Evasion itself is akin to dishonesty. The true expert has no need to equivocate. This is the trademark of the faker and the ruination of any witness. If you have been conscientious in your preparation you must know your subject. If you know your subject you can give direct answers to the cross-examiner. An answer brief and to the point is what everyone in the courtroom wants. Too many witnesses feel a necessity to elaborate in answering the simplest of questions. This not only distracts the jury but detracts from the stature and credibility of the witness. The real expert does not have to gild the lily or throw perfume on the rose.

II—Thou Shalt Not Exaggerate The "Highest and Best Use"

One of the truest tests of the impartial expert is his treatment of this phase of the appraisal process. It is certainly true that many properties are not presently being devoted to their highest and best use. It is perfectly proper for the expert, after a complete investigation of the surrounding neighborhood, an analysis of demand, and a study of trends to testify to a use for which the property is economically suited. There is no need to disappear into the realm of fancy or to indulge in speculation or conjecture. The jury is not interested in fairy tales. If by stretching the highest and best use you give the impression that you are Hans Christian Andersen, M.A.I., the jury, at best, will look upon you as a kindly if not daft story teller or, at worst, a treacherous and incredible medicine man. Some witnesses have a frightening and ineffective habit of transforming the worst desert land into motels, miniature golf courses, shopping centers, antique shops, tea rooms, service stations—the whole litany of possible uses without regard to need, demand or economics. Such witnesses are a delight to the cross examiner and their client's own worst enemy. Highest and best use does not rest upon imagination, it is founded solely upon the most painstaking investigation and analysis. It is in the treatment of highest and best use that the real expert is separated from the romancer and the out-and-out crook.

III—Thou Shalt Not Testify To A Dictated Appraisal

This, of course, does not mean, as one witness once thought, that you must take the stand with a hand written appraisal. You can dictate your notes to your secretary and have them cast in typewritten form, but here the dictation begins and ends. The simple and vital message of this commandment is that you must *never* permit your client or anyone else to dictate to you what your appraisal shall be. A property has only one market value and it is up to you to find it. Let your client, as the owner, take the stand and testify to his idea of the value but you testify to your own opinion. A shocking number of experts have been known to follow the practice of finding a value satisfactory to the client. An appraiser who does this is a disgrace to his profession and a sorry excuse for a man. The violation of this commandment is probably the worst transgression of all. It happens with alarming frequency and is undoubtedly the reason for the great antipathy of courts and juries to the very idea of the expert. Unless the practice of the dictated appraisal can be abolished once and for all there is no hope for the survival of the condemnation procedures as we have known them. This is the real heart of the problem.

IV—Thou Shalt Carefully Examine and Evaluate All Comparable Sales

Many courts now permit direct evidence of the prices at which similar properties have sold as an aid in arriving at the value of the lands under condemnation. It is the duty of the appraiser to be certain that the sales he has chosen to assist him are truly comparable and that they are of sufficiently recent date and are free from distress, duress or other elements of compulsion which would destroy their free market aspects. It is a grave mistake to attempt to break down sales of improved properties to compare with vacant land. Really comparable properties are difficult to find. Be concerned not with the number of comparables but with their quality and their likeness to the lands under appraisal.

V—Thou Shalt Be Wary of Capitalizing Hypothetical Income on Vacant Land

This is a dangerous device at best and should only be used in the rarest of cases and then only by a thoroughly trained and experienced technician. This approach to value is strictly limited in its use under the rules of ethics of certain appraisal organizations. It will be the exceptional case in which this device would even be considered. There is serious question as to its admissibility from an evidentiary standpoint except in extreme situations. As a practical matter,

the use of this method generally indicates a grasping at straws. Its use involves so much conjecture and speculation that its effectiveness before a jury is open to serious doubt. Use it only in most unusual situations and then only after consultation with your counsel on the question of its admissibility in evidence. If it must and can be used be prepared to carefully explain to the jury why you are erecting a hypothetical building and treating its assumed income in arriving at a land residual.

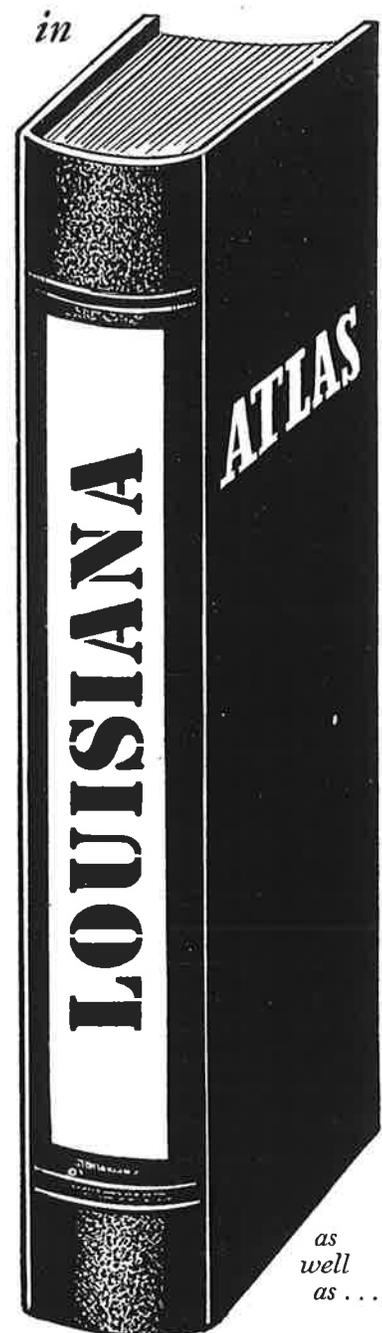
VI—Thou Shalt Be Judicious in the Exercise of Thy Right to Explain Thy Answer

Every answer does not require an explanation. One of the most distasteful of courtroom sights is the witness who, when asked a simple question on cross examination, turns to the judge and asks permission to explain his answer — many times before he has even begun the answer. If an answer can be given in the affirmative or the negative, give it just that way. If a further explanation is truly required give it. You have that right but it must be exercised with rare discretion. Constant explanations can come close to being apologies and can seriously affect your effectiveness on the stand. So-called explanations very often indicate that the witness is on the defensive and that he is desperately trying to shift the course of the cross examination away from some real or imagined Achilles heel. This has two drastic effects. First, it causes the jury to wonder why the witness is being evasive under the guise of an explanation and second, it alerts the cross examiner to a real weakness. He will then pursue this line of questioning to its logical conclusion and in the process the witness may be utterly destroyed. Far too much material for cross examination is suggested by the witness himself when he squirms and takes refuge in unfortunate "explanations."

VII—Thou Shalt Not Clothe Thyself in The Garments of Infallibility

Unpleasant or not, depending upon your viewpoint, it must be readily admitted that appraising is far from an exact science. The best you can do is to give your opinion and every opinion can be ill-founded or just plain wrong. Your only purpose in being on the stand is that, after you are qualified as a witness, the law assumes that you have a superior knowledge on the subject of valuation. The jury, however, will ultimately decide how well qualified you are. A little humility will do you no harm. There is no mathematical or moral certainty connected with real property valuation and you had better be acutely aware of this. Your responsibility in a condemnation case is a great one. The property under

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appraisal can never be sold in the open market. It is being removed from the market by the condemnation itself so you are simply expressing an opinion of what that property would have brought were it exposed for sale. You can never prove your conclusion for there will never be an actual buyer and seller in the open market who will negotiate a price. You are dealing with an enigma within a riddle wrapped up in a mystery. If you are cross examined on the exactitude of the appraisal process be quick and frank to admit that the opinion as expressed is based upon judgment and experience and that you make no pretense of mathematical certainty or that your appraisal is exact to the dollar. Statements are often made in court by a witness which indicate that he believes that he is dealing with exact and probable values. Reasonable men will revolt at such a suggestion and a witness driven by cross examination to this extremity is all but demolished. Be not proud; be sure only that your appraisal represents your best and most honest judgment.

VIII—Thou Shalt Remember That Thou Art An Impartial Witness and Not an Advocate

You have been called to the stand to express your own opinion. You should have no axe to grind with anyone. It is not your function to be the advocate. Your counsel will occupy that position. Too many witnesses take the stand with a show of belligerency. This is not your property — it is not your money. Your only interest in the case should be the expression of your own opinion of value. Beyond that you have no interest in the case. If you are so foolish as to take the role of the advocate when you are testifying, you will only harm yourself and your client's case. Many advocate-witnesses — and there are more of them around than you would perhaps care to admit — live on to regret their indiscretions. The courts have a peculiar but rather remarkable institution known as the "Court Reporter." His moving pen produces strange scratch marks in his elephantine book. For the proper fee these mysterious symbols can be transcribed into typewriting and then you have facing you the whole regrettable torrent of your advocacy. While you were busy up there on the stand playing the part of the advocate you made some terrible admissions — or don't you remember? You put yourself on record as being either in line or out of line with some established appraisal principle — have you forgotten? You made some sweeping generalizations about certain elements of damage. You wish you had bitten your tongue off — don't you? This is too often the price of advocacy. Someday, perhaps 10 years hence, some enterprising cross examiner will set you up for the kill,

put you on record in *this* case on a particular proposition. He will then pause, reach into the labyrinth which he uses for a brief case, and extract the magical transcriptions of the court reporter in that 10-year old case, and impeach you with your own long-forgotten words. Still want to be the advocate?

IX—Thou Shalt So Live With Thyself That Thy Testimony Would Be The Same If Appearing for The Opposing Party

If only this commandment would be universally observed! It would mark the return to honesty and square dealing. It would restore to grace the justly maligned appraisal trade. This is perhaps the most important single commandment. Its basic goodness should be so obvious as to need no explanation or parenthetical exhortation. It covers the whole field of honesty, integrity, and honor. Give us a man who has one opinion under a given set of facts and who would testify to that opinion regardless of which side called him to the stand.

X—Thou Shalt Always Remember To Control Thy Temper on Cross Examination And Retain A Sense of Humor

It is the function of the cross examiner to discredit your testimony in the eyes of the jury. Cross examination is the anvil of the truth and you must be prepared for a thorough hammering. If the cross examination causes you to lose your temper you have all but lost the case. There is never an excuse for a witness surrendering his self control. If you are right you can afford to keep your temper, and if you are wrong you cannot afford to lose it. A rising blood pressure and an accelerated pulse is no help to your wits or your judgment. Anger is the sign of defeat and capitulation. A smile — not a smirk — will stand you in good stead.

Like it or not, there you have ten courtroom commandments. If you can observe each of them the next time you testify you should do a creditable job and you will be able to sleep well the night you leave the witness chair. Observance of these injunctions on a universal scale by all appraisers could yet turn the tide of public disgust and mistrust. The solution lies in the hearts and consciences of individual appraisers and in a thorough and perhaps wholesale expulsion movement by dedicated appraisal organizations and societies. The unethical must be exposed and expelled. Fortunately the majority are on the side of good and have so conducted themselves but they have permitted the vicious minority to dwell too long within the gates. It may not be too late. It is up to *you* — individually and collectively.

4. Resources and Reviews

Corridor Valuation: An Appraisers Overview

Rahn, Arthur G., *Corridor Valuation: An Appraisers Overview*, Self Published, 2005.

Excerpts

“A right of way should not be confused with an easement. In most cases, a right of way will cross multiple properties and may consist of several easements. An easement is unique to one property.”

“A corridor is always a right of way, but a right of way is not necessarily a corridor. The land involved must be under the total and absolute control of one entity to be classified as a corridor.”

“If there are true comparable sales available, there is no need to use the ATF approach, which is used when there are no comparable sales available.”

Review

Corridor Valuation: An Appraisers Overview is comprehensive volume for longitudinal appraising of corridors and easements, especially railroad easements or rights of way. It is the definitive guide on “At The Fence” (ATF) methods for determining value for these types of right of way or easements. Arthur G. Rahn tells how the ATF method came about and became the standard for appraisers for determining the worth of surrounding territory deeded to the railroads by the federal government. The method became the standard when it was published in 1886 by a federal bureaucrat in an Interstate Commerce Commission bulletin and remains the standard today.

The book has three major parts with the examples and explanations of various appraisal methods. The complete reproduction of the Interstate Commerce Commission booklet on ATF guidelines is one of these sections. The ATF method has its roots in the railroad industry but is now the standard for power line corridor and highway right of way determinations. The ATF method has been tested on pipeline rights of way by many

real estate appraisers, but it has never been established as a meaningful alternative to traditional and historical method of comparative sales analysis, the pipeline industry standard.

Rahn illustrates his points with photographs and examples of many longitudinal type configurations from his days as an appraiser for the railroad company for which he worked for many years. Rahn covers the basic approaches easements and rights of way appraisals (cost, income, and sales analysis) and provides the pros and cons for each. He provides 43 examples of corridor valuations from actual cases, a twist that brings the appraisal process to life and makes the process much easier to understand. Rahn's book belongs in the library of any real estate appraiser that comes close to a power line, railroad, utility, or highway right of way or easement.

Uniform Standards of Professional Appraisal Practice

Appraisal Standards Board, The Appraisal Foundation. *Uniform Standards of Professional Appraisal Practice 2008-2009 Edition*. United States of America, ISBN 978-0-9798728-0-8

Review

This go-to reference databook is published annually by The Appraisal Foundation files updated guidelines and is used in every appraisal course that exists. This is the standard by which all appraisers must stand. It contains all rules, regulations, opinions, guidelines, suggestions, and mandates by which appraiser must operate. There are courses covering this volume through The Appraisal Institute as well as the International Right of Way Association in one day and two day segments.

Oil and Gas Pipelines in Non Technical Language

Meisner, Thomas O., and William L. Leffler . *Oil and Gas Pipelines in Non Technical Language*. Tulsa: Pennwell Publishing Corporation, 2006.

Review

Oil and Gas Pipelines in Non Technical Language is perhaps the most comprehensive book on pipelines available and is the best book on pipelines available whether in technical or non technical language. The book on pipelines is a must have for anyone interested in pipeline transportation of oil, gas and products. Pennwell has had great success during this expansion of the oil industry in providing these plain language/non-engineer talk about drilling, gas distribution, refining, processing and production and has found a market for those of us who are not engineers. Thomas O. Meisner and his colleague William L. Leffler write with understanding of the industry from a specific to general knowledge of each and every phase of pipelining. All is covered to some degree or another.

One only needs to look at the table of contents to appreciate the depth of coverage:

1. How pipelines differ
2. The first leg (history)
3. How pipelines work
4. Oil pipeline operations
5. Natural gas pipeline operations
6. Petrochemical and LPG pipeline operations
7. Offshore pipelines
8. SCADA, controls, and leak detectors
9. Maintenance
10. Investment decisions
11. Major components and how they work
12. Engineering and design
13. Construction
14. Satisfying stakeholders
15. Appendix of Abbreviations and Acronyms, Index.

The “Investment Decisions” section (section 10) will be of most interest to readers of this handbook as Meisner and Leffler delve into methods for evaluating pipelines for purchase and sale.

Miesner has served all over the pipeline industry. He brings 25 years of experience in pipelining with five as president of Conoco Pipeline Company. Currently he is consulting in market development, due diligence, and expert testimony in addition to pipeline education seminars to the industry. Leffler is a retired executive (36 years) with Royal Dutch/Shell. He has worked in refining, marketing, exploration, production, petrochemicals and corporate planning. He earned his MBA and PhD. from NYU. He is the author of *Petroleum Refining in Non Technical Language* and other Pennwell titles. Leffler also provides corporate education via seminars and courses on these subjects related to the petroleum industry.

pipelineknowledge.com

Meisner, Thomas O. *Pipeline knowledge & Development*. Web. www.meisnerllc.com, www.pipelineknowledge.com

Meisner, Thomas O. *Introduction to Pipeline Economics*. Meisner, LLC, 2008. Lecture.

Review

Pipeline knowledge & Development is the website for Miesner, LLC and is managed by Thomas O. Miesner, co-author of *Oil & Gas Pipelines in Non Technical Language*. The site provides various presentations and courses offered by his consulting firm for Pipeline knowledge & Development (PkD). The site also offers a comprehensive overview of the array of resources offered by this experienced and talented pipeliner.

Meisner’s presentation, [*Introduction to Pipeline Economics*](#), is a wonderful resource for the basic methods of evaluating pipelines and determining economics of any active pipeline. Miesner also goes into the various methods of establishing value from highest and best-use from a pipeliner’s viewpoint to construction cost new. A quicker and better

overview cannot be found. This presentation was the basic teaching tool of the American Petroleum Institute (API) school in 2008, and is now available for viewing on the web. For anyone interested in pipeline values, economics, methods of determining worth of an active pipeline, this is the place to start.

IRWA Course 400: Principles of Real Estate Appraisal

Principles of Real Estate Appraisal, International Right of Way Association, Course 400, 2001. Lecture.

Lee, Norman. *Principles of Real Estate Appraisal*. International Right of Way Association, Revision 3, 10 July 2006. Lecture Participant Manual.

Review

This two-day course is divided chronologically by the hour and very clearly goes through the process of appraisal with lecture, discussion, participant manual, question and answer, and PowerPoint presentation. This and all IRWA courses I have taken (about 20) are well done, to the point and have very little “fluff”. The teachers are dead serious as well as most of the participants. As with most all appraisal courses, this one is aimed toward real estate almost to the point that real estate types almost feel like they own the word appraisal. With a little imagination, however, you can apply the same principles to pipeline appraisal.

The initial part of the course deals primarily with definitions and controlling documents such as the Uniform Standards of Professional Practice and quickly gets into the meat of the course by teaching and defining terms such as cost, price, value and market value. The course discusses industry acronyms such as D.U.S.T. (the interaction of Demand, Utility, Scarcity, and Transferability) and EEGS (Economic, Environmental, Governmental, and Social factors that affect value. The course goes on to list the major principles of appraisal: substitution, highest and best use, supply and demand, anticipation, change, consistent use and contribution.

The main part of the course is the valuation process by which appraisers use to develop a value opinion. It is a time tested method by which the problem is identified, scope of work is determined, and data are assembled and analyzed using the three approaches to determine value: cost approach, sales comparison approach, and income capitalization approach. The appraiser checks his information, determines the outcome, makes the decision based on research and analysis, and reports the valuation in either written or oral format as the situation demands.

The information is reinforced by many case studies and classroom examples. This course is one of the many fine courses that the International Right of Way Association educational division offers. Personally, these courses and the certifications that result have greatly extended my career and interest in rights of way and pipelines.

IRWA Course 403: Easement Valuation

Easement Valuation, International Right of Way Association, Course 403, 1995. Lecture.

Finnegan, James H. *Easement Valuation*. International Right of Way Association, International version, Revision 4, 25 August 2006. Lecture Participant Manual.

Review

This one-day (eight-hour) course is one of the premier informative courses available for right of way agents and others interested in working with landowners and right of way issues. The course explains industry terms and basic concepts of easement valuation with practical applications. The course overview states that on completion of the course, you will be able to “solve problems that apply the terminology and concepts to specific easement valuation scenarios”. As with many of the comprehensive IRWA education courses, lectures are interspersed with lively discussions, exercises, case studies, and problem solving. Several hand-outs provide practical cases to work through in class. This is usually done in a team environment and lends well to problem solving and networking. The biggest bonus I received while taking over 20 courses through IRWA is

the numerous networking opportunities. I have never taken a course where I have not made a friend or acquaintance that was good for my business in some way or another.

The outline of the course includes a section on terminology and definitions regarding issues around property rights before going on to basic valuation concepts and definitions. These course covers the many federal, state and local jurisdiction rules and regulations regarding appraisal. The “Easement Valuation” section is the heart of the course and discusses the reason for appraising easements, allocations, unit rules, damages, and benefits. This section also talks about the easement document, case laws and statutes, customs and usage, and dominant and servient estates. There is also a section on easement categories and appraising temporary easements.

5. References

Glossary of Pipeline Appraisal Terms

A

Abandoned Pipeline

1. A pipeline no longer in use by the owner. Not necessarily abandoned and ownership relinquished, but basically taken out of service for various reasons. See idled or out of service pipelines. **2.** A pipeline that is no longer connected to the system and is no longer maintained. The pipeline can be abandoned in place, by removal, or sold. (NPMS glossary) **3.** A pipeline that is physically separated from its source of gas/oil/product and is no longer maintained under 49 CFR Part 192 (PHMSA glossary)

Abandoned

Permanently removed from service

Abandonment of Services

Refers to cessation of services or cessation of a facility that has been used to provide service. For example, the Natural Gas Act provides that a natural gas company subject to NGA regulation may not “abandon” service or facilities without first obtaining Federal Energy Regulatory Commission (FERC) approval.

Abstract

A summary of all the conveyances and other facts, which show the condition of title to a given piece of real estate.

Acid Gas

Natural gas containing carbon dioxide or hydrogen sulfide. These impurities can form acids that corrode metal pipe. Acid gas is conditioned by a sweetening process.

Acquisition Price

The price of natural gas not including the cost of transmission and distribution.

Across the Fence

A type of appraisal with roots in railroad takes in the 1870's when large amounts of acreage was given to railroads as rewards for building railroads to the west and south. Later government workers determined this might be a standard for evaluating all right of way land on either side of easement for taking purposes in the building of highways and power lines. Pipeline companies use a system of traditional values and comparative analysis relating to urban or rural land. Also known as ATF.

Ad Valorem

According to value. Often refers to Ad Valorem Taxes that are assessed to property by local governing authorities. Local entities assess ad valorem taxes on pipelines crossing through their jurisdictions; cities, counties, school districts, etc.

Ad Valorem Tax

A tax, which varies with the value of property. See above regarding pipelines.

Administrator (man)/Administratrix (woman)

One who has been appointed by the appropriate court to administer the estate of a person who has died without a will (intestate)?

Adverse Possession

The open and notorious possession and occupation of real property under an evident claim of title. In pipeline terms, this could apply to an easement or right of way and including the fixture or pipe in the right of way.

Affidavit

A sworn statement in writing, under oath, taken before a Notary Public or other officer authorized to administer oaths, to authenticate a fact or action.

Age-life depreciation

A method to estimate depreciation by developing a ratio between the improvement's effective age and its economic life and then multiplied by the improvement's cost new. IRWA 400

Agent

One who acts for, or in place of, another by authority of him. A real estate agent is one who has been authorized by an owner to sell his property for him. A pipeline broker might act as an agent for a potential purchaser or seller in buying or selling a pipeline or easement.

Agreement of Sale

The agreement of the parties, reduced to writing, setting forth all of the terms and conditions of a sale. Can also be termed Purchase and Sales agreement.

Air Rights

The right to use and control a designated airspace above a real estate parcel. IRWA 400

Alignment Sheets

Blueprints, As-Built Sheets, or other terminology that lays out the plan and procedures exactly as a pipeline is built according to route and includes generally the material used, ownership, and geographical features of terrain among other data. There often exist other pipeline crossings and maintenance reports of the pipeline.

Appraisal

An estimate of value of real property usually for a specific purpose and for a specific date or time. Can apply to other property as well and is often called asset valuations when not included in real property. Example; Pipeline Appraisal, or a specific business appraisal, sometimes referred to as asset valuations. According to the USPAP 2008-2009 edition: the act or process of developing an opinion of value (noun) of or pertaining to appraising and related functions such as appraisal practice or appraisal services (adjective).

Appraisal Consulting

The act or process of developing an analysis, recommendation, or opinion to solve a problem, where an opinion of value is a component of the analysis leading to the assignment results. (USPAP 2008-2009).

Appraisal Date

The date at which the analysis, opinions, and advice in an appraisal, review, or consulting service apply. (USPAP 2003)

Appraisal District

Geographical designation for an area, often a county, where an appraisal jurisdiction conducts valuations or appraisals of mostly real estate and other properties for the purpose of determining value so that taxing authorities within that district can assess taxes. (County, school, city, etc.)

Appraisal Report

1. Any communication, written or oral, of an appraisal, appraisal review, or appraisal consulting service that is transmitted to the client upon completion of an assignment. (USPAP 2003). **2.** Any communication of an appraisal that is transmitted to the client upon completion of an assignment. **3.** There are four report types: Full Narrative, Narrative, Short Narrative, and Form. (Canadian USPAP 2003).

Appraised Value

The appraiser's opinions and conclusions resulting from an assignment. (IRWA Course 400.)

Appraiser

1. One who is qualified to estimate or render an opinion as to the value of real property, and who, in most states, must be the holder of a current Real Estate Broker's License. This term has expanded to include qualified individuals who value any asset or business entity, but not limited to real estate or real property. 2. One who is expected to perform valuation services competently and in a manner that is independent, impartial, and objective. (USPAP '08-'09)

Approaches to Value

The three approaches to developing a value opinion: the cost approach, the income capitalization approach, and the sales comparison approach. In the pipeline appraisal industry, we use variations of these themes plus enhancements.

Appurtenance

An attachment or that which belongs to something else; as a meter is an appurtenance to a pipeline.

Asbestos

The asbestiform varieties of serpentinite (chrysotile), riebeckite, (crocidolite), cummingtonite-grunerite, anthophyllite, and actinolite-tremolite.

Asbestos Containing Material (ACM)

Refers to pipe coating which contains a layer of asbestos embedded in the tar coating or in the felt wrap used in pipe coatings. Category I non friable means ACM packings, resilient floor covering, and asphalt roofing products containing more than 1 per cent asbestos using the method of Polarized Light Microscopy. Category II non friable ACM is that containing more than 1 per cent asbestos using the same method of testing and that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Asbestos Testing

Samples of the presumed asbestos containing material are sent to a laboratory for testing for asbestos content. In a simple test with a cost of under \$50.00, you will find the type of asbestos and the percentage found in the coating. Our standard

Assessed Value

The dollar amount assigned to property by the authorized taxing authority for the purpose of having that property share in taxation.

Assessment

The valuation of property for tax purposes levied to meet some specific purpose.

Assignee

A person, corporation, or entity to whom an agreement or contract is assigned.

Assignment

A transfer for consideration of one's estate, right, title, or interest which he might have in real property to another property. Assignment can be expanded to include other properties that are not considered real property. A valuation service provided as a consequence of an agreement between an appraiser and a client.

Assignor

A person, corporation or entity that assigns an estate, right, title or interest in real property or other types of property to another party.

ATF

See *Across the fence*.

Attestation Clause

Usually the last clause in an instrument, which reads: "IN WITNESS WHEREOF, etc."

Attorney in Fact

A person who has been given legal power to act for another by virtue of a written instrument which is known as a "POWER OF ATTORNEY." The power may be for a specific purpose such as power to execute all oil and gas leases.

B**Backfilling**

The technique for covering a completed pipeline so that adequate fill material is provided underneath the pipe as well as above it. Backfilling prevents pipe damage due to loose rock, abrasion, shifting and washouts.

Bell Holes

A hole dug around a pipeline by men or machinery for the purpose of inspection, repair, or replacement of pipe. In pipeline recovery and removal, this method is used to check pipe for wall thickness using ultra sound equipment and to get a sample of coating if available for lab testing for asbestos, etc. Also, it is an opportunity for a visual inspection of the condition of the exterior of the pipe for evidence of pitting and scale.

Blanket Easement

An easement across a property that is not defined except by the property lines of the landowner. For example, a defined easement or right of way might be defined as being forty feet wide across a tract of land, while a blanket easement might cover an entire tract of land allowing the easement to go wherever the grantee needs or wants it to go. This easement was often granted to allow flow lines or gathering lines to be laid as needed to oil and gas wells as drilled.

Blanket Mortgage

A mortgage, which covers two or more properties given as collateral for a loan.

Bond

A written obligation under seal by which a person or corporation binds itself to pay a certain sum or sums on or before a certain appointed time or term

Broker

One who, being licensed by the state, assists in negotiating sales, purchases, loans and leasing of real property. This term applies to real estate brokers. Other qualified brokers might serve the same purpose as business brokers or pipeline brokers, which are not necessarily licensed by states, but are certified by education or professional organizations.

Burner-tip Price

The price that end user or customer pays for natural gas at the burner tip or user point after the costs of distribution and transmission.

Bundle of rights

All of the rights of real estate ownership. A fee ownership of a real estate parcel that includes possession, enjoyment, disposal, etc. Any one, or several, or the rights, may be transferred or conveyed to another, with the owner retaining any rights not conveyed. (IRWA Course 400).

By-pass

The purchase of gas directly from producers and marketers, rather than through a pipeline company. Federal regulations allow large gas customers and distribution companies to by-pass pipeline companies.

C**Capitalization**

The process of converting into present value or worth a series of anticipated future annual installation of income.

Carbon Dioxide

A by-product of natural gas combustion (CO₂). Carbon Dioxide also occurs as an impurity in some natural gas fields.

Casing

A large pipe in which a carrier pipeline is contained. Casing is used when a pipeline passes under railroad right of ways and some roads.

Cathodic Protection

A means of preventing the destructive electrochemical process of corrosion of a metal object (pipeline) by using it as the cathode of a cell with a sacrificial anode. Cathodic protection is a last resort defense against corrosion in most pipelines.

CFR

Code of Federal Regulations

Chain of Title

A chronological list of all records, conveyances, mortgages, and court actions, which show the condition of a tract of land.

Chattel

Personal property, such as household goods, automobiles, cattle, and all removable fixtures.

Chronological Age

The number of years that have elapsed since the completed construction or improvement. (IRWA Course 400).

Clear

To remove brush, trees, rocks, and other obstructions from an area.

Client

The party or parties who engage an appraiser by employment or a contract in a specific assignment.

Cloud on Title

A defect in the title of real property arising from an instrument or court order purporting to create an interest in the property or a judgment or lien affecting the property.

Common Carrier

Any cargo transportation system available for public use. Nearly all pipelines are common carriers.

Comparables

Properties used as comparisons to opine the value of a specific property. (IRWA Course 400).

Comparative Method

A method used in the cost approach to develop a cost estimate in terms of dollars per unit (e.g., square foot, foot, mile, rod, etc.,)(IRWA Course 400).

Competent Person

One who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure and has been trained accordingly.

Compressor

On gas pipelines, used to maintain pressure in transportation.

Condemnation

The action by which a government entity, public utility, or common carrier vested with the right of eminent domain takes private property for public use.

Condensate

Heavier, liquid hydrocarbons that can exist as gases underground but which re-liquify, or condense, when the gas is produced. Also known as casing head gas or natural gasoline.

Confidential Information

Identified by the client as confidential when providing it to an appraiser and that is not available from any other source; or classified as confidential or private by applicable law or regulation. (USPAP)

Conditioning

Processes that remove water and impurities from natural gas. Gas conditioning processes include sweetening to remove carbon dioxide and hydrogen sulfide and glycol dehydration to remove water.

Consideration

The price, inducement, or influence, which induces a contracting party to enter into a contract.

Contiguous

Adjacent to, in contact with or touching.

Cost Approach

1. One of the three approaches to value. **2.** A set of procedures by which a value indication is obtained by estimating the reproduction or replacement cost of a structure, deducting depreciation from all causes, and adding the land value opinion.

Cost Services Method

A method used in the cost approach to develop a cost estimate through the use of cost service manuals or books. (IRWA Course 400). There are commercial subscription firms who offer this service such as Marshall and Swift.

Cost to Cure

The cost to restore an item of physical deterioration or functional obsolescence to near new or new condition. (IRWA Course 400)

Corrosion Control

The measures used to prevent or reduce the effects of corrosion. These practices can range from simply painting metal, to isolate it from moisture and chemicals, and to insulate it from galvanic currents, to cathodic protection. The use of chemical inhibitors and closed systems are other examples of corrosion control.

Corrosion (pipeline)

Damage caused to metal pipe by acid and water inside the pipe or by electrical differences between the pipe and the surrounding soil.

Covenant

An agreement between two or more parties, by instrument in writing, signed, sealed and delivered, by which one of the parties conveys property or pledges certain actions to the other, or stipulates to the truth of certain facts.

Cover Depth

The measurement from the top of a pipe to ground level along a right of way.

Conveyance

The means by which title to real property is transferred.

Curtesy

The interest a husband has in the real property belonging to his wife (in some states).

Customer value

A term used in appraisal of local distribution companies of natural gas. Those furnishing gas to residential and commercial, industrial users. A per customer amount is placed on each residential customer to assess value to the system.

Cut and Fill

To cut down high ground or fill in low ground to achieve a uniform grade for a pipeline.

D

Damages

In pipeline terminology refers to damages to crops or property that might occur when pipelines are constructed, removed, replaced, or repaired. Compensation for these damages can be paid in funds, material, or labor depending on the negotiating skills of the right of way agent.

Deactivation

The process of making a pipeline inactive.

Dedication

An appropriation of land to some public use, made by the owner, and accepted for such use by or on behalf of the public.

Deed

An instrument in writing and sealed, conveying an interest in real property.

Default

A failure to live up to the terms of a contract such as a mortgage.

Demolition

The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility. In plant demolition, can refer to any related razing, removing, or stripping of asbestos products.

Depletion

The reduction in the value of an asset by reason of the taking away of exhaustible material assets or resources, such as the cutting of trees from a forest or the removal of oil from a well.

Depleted Reservoir

Underground reservoir that has been emptied of commercial amounts of gas or oil. These reservoirs are often used for natural gas storage.

Depreciation

A loss in value of real or personal property due to deterioration, obsolescence, or both.

Devise

Disposition of land or property by the Last Will and Testament of a donor.

Direct Capitalization

An income capitalization approach technique that converts an estimate of a single year's income into value in one step. A variation of this method can also be used by deducting expenses and using the net operating income with a multiple of years or months to determine value, depending on the product: pipeline, mineral royalties, and others.

Direct Comparison Approach

1. One of the three approaches to value. 2. A set of procedures by which a value indication is obtained by comparing properties that have sold recently to the property being appraised. This works well with real estate. There are not enough pipelines sold to use this method effectively in pipeline appraisal work. No two pipelines have enough in common to compare. (IRWA Course 400)

Discount Rate

A yield rate that converts or discounts future payments into present value.

Discounted Cash Flow Analysis

An income capitalization approach technique that converts an estimate of every year's income, over the holding period, and the reversion into value. (IRWA Course 400).

Dispossess

The removal of a tenant, by proper proceedings, for breach of conditions of a lease.

Double Ditching

Method by which soil is replaced in the order it was removed. Applies to digging trenches for laying of pipeline. Some construction or deconstruction contracts of pipelines have requirements for replacing topsoil in this manner.

Dower

The interest a wife has in the real property belonging to her husband (in some states).

D.U.S.T.

The factors that create value are the interaction of demand, utility, scarcity, and transferability.

E

Easement

Any of certain rights held by a person or corporation in land of another as in a right of way easement.

Easement Appurtenant

An easement for the benefit of another property. The easement passes with the property transfer. (A pipeline is sold and the easement goes with it, unless specifically retained by prior owner in right of way document).

Easement, subsurface and surface

The right to use the space at a designated distance below the surface of the land as for pipelines and storage facilities. A surface easement is the right to use the surface of the land as for access and flowage. (IRWA Course 400)

Economic Life

The estimated period over which a property may be profitably utilized. Example; a pipeline might have a useful economic life of thirty to fifty years.

Ejectment

A proceeding to recover possession of land or damages for unlawful detention.

Eminent Domain

The right by which a government entity, public utility, or common carrier may take private property for public use.

Encroachment

Unlawful gains upon the lands, property, or authority of another. Buildings, ponds, even fences, pavement over a pipeline easement would be considered encroachment.

Encumbrance

An interest or right in real property, which diminishes the value of the fee such as mortgages, judgments, and easements.

Equity

The extent of actual value one has in real property.

Equity of Redemption

The right of a mortgager to redeem the mortgaged premises by payment of interest and principal.

Escheat

The reversion of property to the state and other government entity due to lack of heirs, or, the lack or failure of persons legally entitled to hold said property.

Escrow

The placing of a deed, money, or other thing in the hands of a third party to be held until certain conditions are met by one or both of the other two parties.

Estate

The interest, which one has in property.

Et al

Latin term meaning “and others.”

Et Ux

Latin term meaning “and wife.”

Et Vir

Latin term meaning “and husband.”

Eviction

The act of removing a person from lands he had held by process of law.

Executor (male)/Executrix (female)

A person who has been appointed in a will to carry out directions and requests of the deceased person. Note that a court appoints an Administrator when no will was left while an Executor implies that a will exists.

Express

Definite and explicit. Usually contrasted with “implied.”

F**Fair Market Value**

The estimated highest price a property will bring if sold on the open market. Usually defined as the highest price a buyer is willing to pay and the lowest price a seller is willing to take, with neither party under any type of stress with regard to the property.

Factors that Create Value

The factors that create value are the interaction of demand, utility, scarcity, and transferability. D.U.S.T. (IRWA Course 400)

Factors that Affect Value

The factors that can affect value: 1. Economic factors that examine the relationship among demand, supply, and utility. These factors affect the management of limited economic resources. 2. Environmental factors include both the natural environment and the developed environmental characteristics. 3. Governmental factors include zoning, tax levies, the educational system, building codes, etc. 4. Social factors in the broadest sense, relate to the demographic characteristics of age and gender composition, population, population changes and social attitudes. (IRWA Course 400)

Fallow Land

Land, usually under cultivation, which lies idle for a growing season.

Fee Simple

An estate in property which allows an owner complete control over his property, within the law, to dispose of the property in any manner during his lifetime; and to pass the property to his heirs or legal representatives upon his death.

Feme Covert

A married woman.

Fencing Crew

Pipeline construction workers responsible for constructing temporary gates at points where a right of way crosses fence lines.

Federal Energy Regulatory Commission

An independent agency (created in 1977) of the Department of Energy that has jurisdiction over oil and gas pipelines in interstate commerce. AKA FERC.

Feme Sole

A single woman, including widows and divorcees.

FERC

Federal Energy Regulatory Commission.

Fill

The use of material to raise the grade of land to a desired level.

Flume Pipe

Large pipe used in creek and stream ditching in pipeline construction or deconstruction to allow the water to flow normally and provide a passage for equipment over the water.

Force Majeure

An act outside the control of two contracting parties such as storms, earthquakes, wars, etc.

Foreclosure

The termination of all rights and the retaking of property covered by a mortgage.

Freehold

An estate in land of an undetermined duration. It can be a life estate, a lease with the unlimited right of renewal, or a fee simple estate.

Front Foot

A measure of land being one foot in width along the frontage of a tract. The depth of the tract would be unknown unless specifically mentioned.

G**Gas Marketer**

Person acting as middleman between a gas customer and the source of gas supply whether it be producer or pipeline company, etc. The marketer actually takes title to the gas for a period.

Gathering Line

A pipeline usually of small diameter, used in gathering crude oil or gas from the field to a main pipeline.

Gathering System

The pipelines and other equipment needed to transport oil, gas or both from wells to a central point- the gathering station.- where there is the accessory equipment required to deliver a clean and salable product to the market or to another pipeline. An oil gathering system includes oil and gas gathering separators, emulsion treaters, gathering tanks, and similar equipment. A gas gathering system includes regulators, compressors, dehydrators, and associated equipment.

Good

Sufficient in law. Normally used in contrast with “valuable.”

Grading

The process of providing a smooth and even work area to facilitate the movement of equipment onto and along the right of way. Grading entails leveling, cutting and filling.

Grant

1. To bestow, convey or transfer. **2.** An instrument conveying rights or property.

Grantee

One to whom a grant is made; the purchaser or company acquiring a right of way easement.

Grantor

One who conveys; the seller or landowner conveying a right of way easement.

H**Habendum**

That part of a conveyance beginning with “to have and to hold.”

Hereditaments

Lands and other things capable of being inherited.

Highest and Best Use

The reasonably probable and legal use of a property which is physically possible, appropriately supported, and financially feasible, and that results in the highest value.

Holiday

A defect in the coating on metal pipe that can lead to corrosion.

Hydrogen Sulfide (Sour Gas)

A very poisonous foul smelling gas that occurs as an impurity in some natural gas fields. Hydrogen sulfide can form sulfuric acid, which corrodes metal pipe (pipelines) and is removed from natural gas by conditioning process.

I**Income Approach**

1. One of the three approaches to value. 2. A set of procedures by which income is converted into value through the application of a rate.

Implied

A deduction from certain circumstances. Usually used in contrast with “Express.”

Idled Pipeline

Out of service pipeline. One with no product or throughput in the pipeline, usually purged and possibly filled with nitrogen with some pressure.

Intestate

Without leaving a will.

Inactive Pipeline

A pipeline that is being maintained under Part 192, but is not presently being used to transport gas. (Gas Piping Technology Committee Guide definition)

Inactive Pipeline

The pipeline is maintained and can be brought back into service. (NPMS Glossary)

In-Service Pipeline

A pipeline that transports gas or hazardous liquid, or is not currently transporting products but is maintained and can be brought back into service. (NPMS Glossary)

J**Joint Tenancy**

Two or more persons who hold land in fee simple for years, for life, or at will. They have one conveyance commencing at the same time and maintain undivided possession. Upon death of one, all rights, title and interest in the property remain with the survivors.

Judgment

A debt or obligation evidenced by a court decree. A judgment creates a lien against the property of a judgment debtor.

L**Land Contract (Purchase Contract)**

A contract for the purchase of land where the deed is delivered only after the payment for the land, usually in installments, has been made.

Land Warrant

A warrant issued by the Federal Government to purchasers of public land.

Landlord

An owner of an estate in land who has leased the same for a period of time.

Lease

An agreement setting forth the terms and conditions under which a person may hold and use land.

Leasehold

An estate in land less than fee simple, usually held under lease for a specific period of time.

Lessee

A holder of real property under terms of a lease.

Lessor

One who conveys certain rights to real property for a specific period of time.

License

As used in real estate, the right to enter upon a tract of land for a specific purpose without possessing any estate in the property.

Lien

An encumbrance upon property usually for payment of some debts or obligation.

Life Estate

An estate of varying degrees in land limited to the life of the principal.

Looping

The technique of laying an additional pipeline alongside an existing one when additional capacity is desired.

M**Maintenance Reports**

Periodic reports written by maintenance personnel regarding the status of a pipeline. Usually written for leakage, replacement, relocations for pipe, etc.

Mechanics Lien

A lien against property, which is awarded to a person who performs certain, work or provides certain material for work on a tract of land.

Meter

Device used to measure the volume of gas passing through a certain point in a pipeline or distribution system. Meter run can be a series of measuring devices. Orifice meter.

Metes and Bounds

A method of land identification describing the outer boundaries of a tract of land.

Migration

A circumstance where over time a pipeline segment may move or migrate to the surface. Soil erosion and wind factors play a part as well.

Mortgage

A pledge of a certain property, usually written in the form of a conveyance, for the payment of a debt of obligation.

Mortgagee

The person or entity taking or accepting the mortgage as a pledge.

Mortgagor

The person or entity that pledges property (the Borrower).

Mounding

A process of building up or crowning with soils the area directly over where a pipeline was removed. This procedure prevents and compensates for any settling of soil that might occur over time.

N**Natural Gas Liquids (NGL)**

Heavier hydrocarbons including condensate, butane, propane, and ethane.

Net Operating Income

The estimated effective gross income less expenses (fixed, variable, and replacement allowances). (IRWA Course 400)

Net Present Value

The difference between the present value of the positive cash flows and the present value of the negative cash flows. (IRWA Course 400)

Nominal Consideration

A payment that has no relation to the real value of the property.

NPMS

National Pipeline Mapping Service

Naturally Occurring Radioactive Material

Radioactivity on pipe or other material that has been exposed to liquids primarily passing through that leaves a degree of this same substance. AKA NORM.

NORM

Naturally Occurring Radioactive Material

O**Operating Expenses**

The sum of all fixed and variable operating expenses and the replacement allowance.

OPS

Office of Pipeline Safety

Out of Service Pipeline

An idled pipeline with no product or throughput.

P

PACM

Presumed asbestos containing material or thermal system insulation and surfacing material found in buildings, coatings and other structures to prevent heat loss or gain and built prior to 1980. The insulation called Thermal System Insulation contained ACM for the purpose of insulation.

Permanent Easement

1. An easement conveyed in perpetuity. 2. An easement that lasts forever. (IRWA Course 400)

Perpetuity

Continuing forever. Many right of way agreements written in the early part of the twentieth century were written "in perpetuity".

PHMSA

Pipeline and Hazardous Materials Safety Administration, DOT

Pig

A scraping tool that is forced through a pipeline or flow line to clean out accumulations of wax, scale, and debris from the walls of the pipe. It travels with the flow of product in the line, cleaning the pipe walls, by means of blades or brushes affixed to it. Also called a line scraper or go-devil.

Pipeline

1. A system of connected lengths of pipe usually buried in the earth or laid on the sea floor, that is used for transporting petroleum and natural gas. A pipeline serves as both a conveyor and temporary container. 2. All parts of the physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenances attached to the pipe, compressor units, metering stations, regulation stations, checking stations, holders, and fabricated assemblies. (49 CFR 192.3 definition)

Pipeline Appraisal

An asset valuation for a pipeline. Usually undertaken for banks, purchasers and sellers of pipeline to determine fair market value. Often used for estate settlements and tax disputes with local appraisal districts.

Pipeline Facility

New or existing pipeline, rights of way, and any equipment, facility, or building used in the treatment or transportation of gas, hazardous liquids, or carbon dioxide. (49 CFR 192.3 Definitions)

Pipeline Patrol

A watch, usually maintained from an airplane, to check the route of a pipeline for leaks or other abnormal conditions.

Plat

A map or drawing showing the boundaries of a tract of land.

Presumptive Rights

Rights obtained under presumption of a grant after a period of years.

Products Line

A pipeline used to ship refined products such as diesel fuel, jet fuel, and others.

Proven Reserves

The amount of oil or natural gas that is economically recoverable using current technology.

Purchase Contract

A contract for the purchase of land usually setting out a series of periodical payments. Upon completion of the payments, the title to the land is transferred.

Q**Quitclaim Deed**

An instrument which conveys any interest a person may have in property but does not profess to the validity of such interest.

R**Realtor**

A registered name, which designates membership in the National Association of Realtors.

Realty

A term used for real property.

Rectifier

A device used to convert alternating current into direct current. Used in pipeline corrosion protection.

Regulation

A rule or order having the force of law issued by an executive authority of a government. Generally, regulations are issued to implement or enforce laws or legislation enacted by the government.

Release

In right of way acquisition, an instrument whereby a landowner or tenant relinquishes any claim of damage caused by construction of a pipeline or other installation.

Release of Right of Way

Instrument for recording a right of way back to a landowner. This is a common practice of pipeline recovery companies after a pipeline is removed from a property.

Remainder

A future interest created in some person other than the grantor such as in a Life Estate.

Replacement Cost

The cost to replace a structure of equivalent utility to the subject structure as of the effective date of the appraisal. 2. The cost to replace structural components. (IRWA Course 400)

Reseeding

Process of sowing or planting additional grass seeds to a right of way after installation or removal of a pipeline.

Reservation

A right or interest reserved out of a tract by the grantor unto himself or his assign as minerals.

Restriction

A limitation on the use of land usually created in a conveyance.

Retired Pipeline

A pipeline that is still connected to the system, but has been taken out of service and is no longer maintained. The operator plans to abandon the pipeline and is waiting for approval. (NPMS Glossary)

Reversion

A return or conveyance of rights in an estate as a result of certain conditions. For example, an easement may contain the condition that all rights granted revert to the grantor in the event the easement is not used for a given period of time.

Right of way

A strip of land over which a pipeline, electrical line, telephone line, railroad or roadway is constructed.

Right of Way Agent

A person engaged in the acquisition of land and land rights to accommodate pipelines, electrical lines or facilities pertaining to rights-of-way.

Right of Way Agreement

An agreement in writing, under seal, in which an owner in real property grants a right of way upon, over and across his land. The basic contract between a landowner (grantor) and a pipeline company (grantee).

Right of Way Restoration

In pipeline construction or deconstruction, the process of returning a right of way to its original condition or better after the work is completed. Restoration depends on legal stipulation in the contract with the landowner and the pipeline company.

Riparian Rights

The rights of landowners of lands on waterways as they related to ownership.

Road Crossing

Laying of a pipeline under a roadbed or through a road.

S**Scope of Work**

The type and extent of research and analyses in an assignment (USPAP)

Severance Damage

The loss in value of the remaining tract by virtue of the taking of a part.

SR/WA

Senior Right of Way Agent designation for the highest certification available for the International Right of Way Association, a 10,000-member organization made up of right of way agent professionals.

Steel Pipe Testing

The basic form of testing for pipeline steel is a yield (burst) test, which measures in psi the amount of pressure needed to burst the pipe. The Tensile test measures the hardness of the steel. Other tests can indicate the chemical properties present. Antech Laboratories in Houston does a good work at reasonable prices.

Survey

The determining of boundaries and corners, with distances and directions in order to identify land.

T

Tank Farm

A group of large tanks maintained by a pipeline and used to store oil after it has been transferred from the production tanks and before it is transferred to the refinery.

Tenancy by Entirety

A tenancy, which is created between a husband and wife and upon death of either, the other, is vested with the whole.

Tenancy in Common

A form of ownership in which each owner owns an undivided interest in property. If one of the owners dies, his interest passes to his heirs or assigns.

Term

Usually relates to term of contract for a pipeline right of way. In older right of way agreements, there were no set limits as to expiration of grantee rights for easements. Others might set limits based on whether or not the pipeline was still in use or “two year after cessation of use”, etc. This is a key part of a right of way agreement.

Testate

One who dies leaving a valid will.

Trunk Line

A main pipeline to which other gathering lines may gather to.

Trust Deed

A mortgage on property to a third party to be held as security for a debt.

U

Uniform Standards of Professional Appraisal Practice (USPAP)

Standards of practice on behalf of appraisers and users of appraisal services determined by The Appraisal Standards Board (ASB) of The Appraisal Foundation which develops, interprets, and amends same. The USPAP has five sections: Definitions, Standards, Preamble, Rules, and Statements on Appraisal Standards. Each edition has changes and updates and state and federal regulatory authorities enforce the content of the current or applicable edition of the USPAP

V

Valve

A device used to control the rate of flow in a pipeline, to open or shut off a line completely, or to serve as an automatic or semiautomatic safety device. Those with extensive usage include the gate valve, plug valve, globe valve, needle valve, check valve, and pressure relief valve.

Vendee

Purchaser of property.

Vendor

Seller of property.

Vent

A device installed on one end of that portion of a pipeline that crosses under a road. The vent marks the boundary of the highway right of way and provides an exit for any fluids should the pipeline develop a leak. It also aids in locating line breaks.

W

Waiver

The relinquishment or surrender of some claim, right, or privilege.

Warrant

To assure by an express covenant that the title is good.

Z

Zoning

The division of a municipality into districts with restricted uses imposed on each type district.

Calculating the Weight Per Foot Per Pipe or Tubing

The following formula provides the weight (in lbs) per foot of pipe given the outside diameter (OD) in inches and wall thickness (T) of the pipe in inches.

$$\text{Weight} = (\text{OD}-\text{T}) \times 10.68 \times \text{T}$$

This formula applies to all plain end pipe and tubing. For example, to determine the weight per foot of pipe that has an outside diameter of 12 $\frac{3}{4}$ " with a wall thickness of 0.250":

$$\text{Weight} = (12.75-.250) \times 10.68 \times .250$$

$$\text{Weight} = 33.38 \text{ lbs/ft.}$$

ERW and Seamless Line Pipe Tables: Diameters, Weights, and Grades

NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE	NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE
1"	1.315	.072	.96		3"	3-1/2"	.250	7.01	
		.083	1.09				.276	7.66	80 XH
		.096	1.24				.375	10.01	160
		.109	1.40	10			.552	13.69	XXH
		.125	1.59				.083	3.03	5
		.133	1.68	40 STD			.095	3.46	
		.179	2.17	80 XH			.109	3.95	
		.250	2.84	160			.120	4.33	10
		.385	3.66	XXH			.125	4.51	
							.141	5.06	
1-1/4"	1.660	.072	1.22		3 1/2"	4"	.083	3.47	5
		.083	1.40				.095	3.96	
		.095	1.59				.109	4.53	
		.109	1.81	10			.120	4.97	10
		.125	2.05				.125	5.17	
		.140	2.27	40 STD			.141	5.81	
		.191	3.00	80 XH			.156	6.40	
		.250	3.76	160			.172	7.03	
		.382	5.21	XXH			.188	7.65	
							.226	9.11	40 STD
1-1/2"	1.900	.083	1.61		4"	4 1/2"	.083	3.92	5
		.095	1.83				.095	4.47	
		.109	2.08	10			.109	5.11	
		.125	2.37				.120	5.61	10
		.145	2.72	40 STD			.125	5.84	
		.200	3.63	80 XH			.141	6.56	
		.281	4.86	160			.156	7.24	
		.400	6.41	XXH			.172	7.95	
							.188	8.66	
							.203	9.32	
2"	2 3/8"	.083	2.03		5"	5 9/16"	.083	4.86	
		.095	2.31				.125	7.26	
		.109	2.64	10			.152		
		.125	3.00						
		.134	3.31						
		.141	3.36						
		.154	3.65	40 STD					
		.172	4.05						
		.188	4.39						
		.218	5.02						
2-1/2"	2 7/8"	.083	2.47	5					
		.095	2.82						
		.109	3.22						
		.120	3.53	10					
		.125	3.67						
		.141	4.12						
		.156	4.53						
		.172	4.97						
		.188	5.40						
		.203	5.79	40 STD					
.216	6.13								

NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE	NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE
		.134	7.77	10					
		.156	9.01		8"	8 5/8"	.090	8.20	
		.188	10.79				.105	9.55	
		.219	12.50				.109	9.91	5
		.258	14.62	40 STD			.120	10.90	
		.281	15.85				.125	11.35	
		.312	17.50				.134	12.15	
		.344	19.17				.141	12.78	
		.375	20.78	80 XH			.149	13.49	10
		.500	27.04	120			.156	14.11	
		.625	32.96	160			.164	14.82	
		.750	38.55	XXH			.172	15.52	
	6"						.179	16.15	
		.059	3.74				.188	16.94	
		.075	4.75				.203	18.26	
		.105	6.61				.219	19.66	
		.125	7.84				.237	21.23	
		.135	8.46				.250	22.36	20
		.142	8.88				.277	24.70	30
		.156	9.74				.312	27.70	
		.165	10.28				.322	28.55	40 STD
		.172	10.71				.344	30.42	
		.188	11.67				.375	33.04	
		.203	12.57				.406	35.64	60
		.219	13.52				.438	38.30	
6"	6 5/8"	.075	5.25				.500	43.39	80 XH
		.083	5.80				.562	48.40	
		.090	6.28				.594	50.95	100
		.105	7.31				.625	53.40	
		.109	7.59	5			.719	60.71	120
		.120	8.34				.812	67.76	140
		.125	8.68				.875	71.41	160
		.135	9.36	10	9"	9 5/8"	.906	74.69	XXH
		.141	9.76				.342	33.91	STD
		.149	10.31				.500	48.73	XH
		.156	10.78						
		.164	11.32			10"	.075	7.95	
		.172	11.58				.105	11.10	
		.188	12.92				.125	13.18	
		.203	13.92				.135	14.22	
		.219	14.98				.142	14.96	
		.237	16.17				.156	16.40	
		.250	17.02				.165	17.33	
		.280	18.97	40 STD			.172	18.05	
		.312	21.04				.188	19.70	
		.344	23.08				.203	21.24	
		.375	25.03				.219	22.88	
		.432	28.57	80 XH	10"	10 3/4"	.060	6.85	
		.500	32.71	120			.075	8.55	
		.562	36.39				.090	10.25	
		.625	40.05				.105	11.94	
		.719	45.35	160			.109	12.39	
		.864	53.16	XXH			.120	13.58	
	8"	.059	5.00				.125	14.18	
		.075	6.35				.135	15.30	5
		.105	8.85				.141	15.98	
		.125	10.51				.149	16.87	
		.135	11.34				.156	17.65	
		.142	11.92				.164	18.54	10
		.156	13.07				.179	20.21	
		.165	13.81				.188	21.21	
		.172	14.38				.203	22.87	
		.188	15.69				.219	24.63	
		.203	16.90				.237	26.61	
		.219	18.20				.250	28.04	20
							.279	31.20	
							.307	34.24	30

NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE	NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE
		.312	34.78				.109	17.79	
		.322	35.86				.120	18.52	
		.344	38.23				.125	19.84	
		.365	40.48	40 STD			.134	22.04	
		.375	41.55				.149	23.07	
		.438	48.24				.156	24.23	
		.500	54.74	60 XH			.164	26.42	
		.562	61.15				.179	27.73	
		.594	64.43	80			.188	29.91	
		.625	67.58				.203	30.93	
		.719	77.03	100			.210	32.23	
		.812	68.18				.219	34.84	
		.844	89.29	120			.237	36.71	10
		1.000	104.13	140			.250	41.17	
		1.125	115.64	160			.281	43.47	
							.297	45.61	20
11"	11 3/4"	.375	45.56	STD			.312	48.18	
		.500	60.08	XH			.330	50.17	
	12"	.105	13.34				.344	54.57	30 STD
		.125	15.85				.375	63.44	40
		.135	17.11				.438	72.09	XH
		.142	17.98				.500	80.66	
		.156	19.73				.562	85.05	60
		.165	20.86				.625	89.28	
		.172	21.73				.688	97.81	
		.188	23.72				.750	106.13	80
		.203	25.58				.812	114.37	
		.219	27.55				.875	122.65	
							.938	130.85	100
12"	12 3/4"	.060	8.13				1.094	150.79	120
		.075	10.15				1.250	170.21	140
		.090	12.17				1.406	189.11	160
		.105	14.18						
		.109	14.72			16"	.060	10.21	
		.120	16.19				.075	12.76	
		.125	16.85				.090	15.29	
		.134	18.05				.105	17.82	
		.141	18.99				.120	20.38	
		.149	20.05				.125	21.19	
		.156	20.98				.134	22.71	
		.164	22.04	5			.141	23.88	
		.172	23.11				.149	25.22	
		.179	24.03	10			.156	26.40	
		.188	25.22				.164	27.74	
		.203	27.20				.179	30.25	
		.219	29.31				.188	31.75	
		.237	31.67			16"	.203	34.25	
		.250	33.38	20			.219	36.91	
		.281	37.42				.237	39.90	
		.297	39.50				.250	42.05	10
		.312	41.45				.281	47.17	
		.330	43.77	30			.297	49.81	
		.344	45.58				.312	52.27	20
		.375	49.56	STD			.330	55.23	
		.438	57.59				.344	57.52	
		.500	65.42	XH			.375	62.58	30 STD
		.562	73.15	60			.438	72.80	
		.625	80.93				.500	82.77	40 XH
		.688	88.63	80			.562	92.66	
		.750	96.12				.625	102.63	
		.844	107.32	100			.656	107.50	60
		1.000	125.49	120			.688	112.51	
		1.125	139.67	140			.750	122.15	
		1.312	160.27	160			.812	131.71	
	14"	.060	8.93				.844	136.62	80
		.075	11.15				.875	141.34	
		.090	13.37				.938	150.89	
		.105	15.58				1.000	160.20	

NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE	NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE
		1.031	164.82	100			.281	59.18	
		1.125	178.72				.297	62.50	
		1.219	192.43	120			.312	65.60	
		1.437	223.50	140			.330	69.32	
		1.539	245.11	160			.344	72.21	
							.375	78.60	20 STD
	18"	.060	11.50				.438	91.51	
		.075	14.36				.500	104.13	30
		.090	17.22				.562	116.67	
		.105	20.07				.593	122.91	40
		.120	22.92				.625	129.33	
		.125	23.86				.688	141.90	
		.134	25.57				.750	154.19	
		.149	28.41				.812	166.40	60
		.156	29.73				.875	178.72	
		.164	31.24				.938	190.96	
		.172	32.75				1.000	202.92	
		.179	34.07				1.031	208.87	80
		.188	35.76				1.125	226.78	
		.203	38.58				1.187	238.50	
		.219	41.59			20"	1.250	250.31	
		.237	44.96				1.280	255.91	100
		.250	47.39	10			1.375	273.51	
		.281	53.18				1.500	296.37	120
		.297	56.15				1.750	341.09	140
		.312	58.94	20			1.968	379.00	160
		.330	62.28						
		.344	64.87						
		.375	70.59	STD		22"	.060	14.06	
		.438	82.15	30			.075	17.56	
		.500	93.45	XH			.090	21.06	
							.105	24.55	
	18"	.562	104.67	40			.120	28.04	
		.625	115.98				.125	29.20	
		.656	121.51				.134	31.29	
		.688	127.21				.149	34.77	
		.750	138.17	60			.156	36.39	
		.812	149.06				.164	38.25	
		.875	160.03				.179	41.72	
		.937	170.75	80			.188	43.79	
		.938	170.92				.203	47.26	
		1.000	181.56				.219	50.94	
		1.062	192.11				.239	55.55	
		1.125	202.75				.250	58.07	
		1.156	207.96	100			.281	65.18	
		1.187	213.14				.297	68.84	
		1.250	223.61				.312	72.27	
		1.375	244.14	120			.330	76.37	
		1.562	274.22	140			.344	79.56	
		1.781	308.50	160			.375	86.61	
							.406	93.63	
	20"	.060	12.78				.438	100.86	
		.075	15.96				.500	114.81	
		.090	19.14				.562	128.67	
		.105	22.31				.625	142.68	
		.120	25.48				.688	156.60	
		.125	26.53				.750	170.21	
		.134	28.43				.812	183.75	
		.149	31.59				.875	197.41	
		.156	33.06				.938	211.00	
		.164	34.74				1.000	224.28	
		.172	36.42				1.062	237.48	
		.179	37.89				1.125	250.81	
		.188	39.78				1.187	263.85	
		.203	42.92				1.250	277.01	
		.219	46.27				1.312	289.88	
		.239	50.44				1.375	302.88	
		.250	52.73	10			1.437	315.58	

NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE	NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE
	24"	1.500	328.41				.312	85.60	10
		.060	15.34				.330	90.47	
		.075	19.16				.344	94.26	
		.090	22.98				.375	102.63	
		.105	26.80				.406	110.98	
		.109	30.60				.438	119.57	
		.120	31.87				.500	136.17	20
		.125	34.16				.562	152.68	
		.134	37.65				.625	169.38	
		.149	39.73				.688	185.99	
		.156	41.75				.750	202.25	
		.164	45.54				.812	218.43	
		.179	47.81				.875	234.79	
		.188	51.59				.938	251.07	
		.203	55.62				1.000	267.00	
		.219	60.65						
		.239	63.41			28"	.060	17.90	
		.250	71.18				.075	22.29	
		.281	75.18				.090	26.83	
		.297	78.93				.105	31.28	
		.312	83.42				.120	35.73	
		.330	86.91				.125	37.21	
		.344	94.62	20			.134	39.88	
		.375	102.31				.149	44.32	
		.438	110.22				.156	46.39	
		.500	125.49				.164	48.76	
		.562	140.68	30			.179	53.19	
		.625	156.03				.188	55.84	
		.687	171.05	40			.203	60.26	
		.688	171.29				.219	64.98	
		.750	186.23				.239	70.86	
		.812	201.09				.250	74.09	
		.875	216.10				.281	83.19	
		.938	231.03				.297	87.87	
		.968	238.11	60			.312	92.26	
		1.000	245.64				.330	97.52	
		1.062	260.17				.344	101.61	
		1.125	274.84				.375	110.64	
		1.187	289.20				.406	119.65	
		1.218	296.35	80			.438	128.93	
		1.250	303.71				.500	146.85	
		1.312	317.91			28"	.562	164.69	
		1.375	332.25				.625	182.73	
		1.437	346.28				.688	200.68	
		1.500	360.45				.750	218.27	
		1.531	367.39	100			.812	235.78	
		1.562	374.31				.875	253.48	
		1.812	429.39	120			.938	271.10	
		2.062	483.12	140			1.000	288.36	
		2.343	541.93	160					
	26"	.060	16.62			30"	.060	19.19	
		.075	20.77				.075	23.97	
		.090	24.90				.090	28.75	
		.105	29.04				.105	33.52	
		.120	33.17				.120	38.29	
		.125	34.54				.125	39.88	
		.134	37.02				.134	42.74	
		.149	41.14				.149	47.50	
		.156	43.06				.156	49.72	
		.164	45.25				.164	52.26	
		.179	49.36				.179	57.01	
		.188	51.82				.188	59.86	
		.203	55.93				.203	64.60	
		.219	60.30				.219	69.66	
		.239	65.76				.239	75.97	
		.250	68.75				.250	79.43	
		.281	77.18				.281	89.19	
		.297	81.53						

NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE	NOM. SIZE	O.D. SIZE	WALL SIZE	WT. PER FT. PLAIN END	SCHEDULE
		.297	94.22				.875	309.55	
		.312	98.93	10			.938	331.21	
		.330	104.57				1.000	352.44	
		.344	108.95						
		.375	118.65			36"	.060	23.03	
		.406	128.32				.075	28.78	
		.438	138.29				.090	34.52	
		.500	157.53	20			.105	40.25	
		.562	176.69				.120	45.98	
		.625	196.08				.125	47.89	
		.688	215.38				.134	51.33	
		.750	234.29				.149	57.05	
		.812	253.12				.156	59.72	
		.875	272.17				.164	62.77	
		.938	291.14				.179	68.48	
		1.000	309.72				.188	71.90	
							.203	77.61	
	32"	.250	84.77				.219	83.69	
		.281	95.19				.239	91.28	
		.312	105.59				.250	95.45	
		.344	116.30				.281	107.20	
		.375	126.66				.297	113.25	
		.406	136.99				.312	118.92	
		.438	147.64				.330	125.72	
		.500	168.21				.344	131.00	
		.562	188.70				.375	142.68	
		.625	209.43				.406	154.34	
		.688	230.08				.438	166.35	
		.750	250.31				.500	189.57	
		.812	270.47				.562	212.70	
		.875	290.86				.625	236.13	
		.938	311.17				.688	259.47	
		1.00	331.08				.750	282.35	
							.812	305.16	
	34"	.250	90.11				.875	328.24	
		.281	101.19				.938	351.25	
		.312	112.25				1.000	373.80	
		.344	123.65						
		.375	134.67						
		.406	145.67						
		.438	157.00						
		.500	178.89						
		.562	200.70						
		.625	222.78						
		.688	244.77						
		.750	266.33						
		.812	287.81						

Plain End Line Pipe Tables: Diameters, Weights, and Grades

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
2 3/8	.083	2.03	1260	1470	1760	1930	2180	2350	2520	2730	2940
2 3/8	.109	2.64	1650	1930	2310	2530	2860	3000	3000	3000	3000
2 3/8	.125	3.00	1890	2210	2650	2910	3000	3000	3000	3000	3000
2 3/8	.141	3.36	----	----	2990	3000	3000	3000	3000	3000	3000
2 3/8	.154 STD	3.65	2330	2500	3000	3000	3000	3000	3000	3000	3000
2 3/8	.172 STD	4.05	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 3/8	.188 STD	4.39	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 3/8	.218 XH	5.02	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 3/8	.250 XH	5.67	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 3/8	.281 XH	6.28	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 3/8	.436 XXH	9.03	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 7/8	.083	2.47	1040	1210	1460	1590	1800	1940	2080	2250	2430
2 7/8	.109	3.22	1360	1590	1910	2090	2370	2550	2730	2960	3000
2 7/8	.125	3.67	1570	1830	2190	2400	2710	2920	3000	3000	3000
2 7/8	.141	4.12	1770	2060	2470	2710	3000	3000	3000	3000	3000
2 7/8	.156	4.53	1950	2280	2730	3000	3000	3000	3000	3000	3000
2 7/8	.172	4.97	2150	2500	3000	3000	3000	3000	3000	3000	3000
2 7/8	.188	5.40	2350	2500	3000	3000	3000	3000	3000	3000	3000
2 7/8	.203 STD	5.79	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 7/8	.216 STD	6.13	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 7/8	.250 STD	7.01	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 7/8	.276 XH	7.66	2500	2500	3000	3000	3000	3000	3000	3000	3000
2 7/8	.552 XXH	13.69	2500	2500	3000	3000	3000	3000	3000	3000	3000
3 1/2	.083	3.03	850	1000	1200	1310	1480	1590	1710	1850	1990
3 1/2	.109	3.95	1120	1310	1570	1720	1940	2090	2240	2430	2620
3 1/2	.125	4.51	1290	1500	1800	1970	2230	2400	2570	2790	3000
3 1/2	.141	5.06	1450	1690	2030	2220	2510	2710	2900	3000	3000
3 1/2	.156	5.57	1600	1870	2250	2460	2780	3000	3000	3000	3000
3 1/2	.172	6.11	1770	2060	2480	2710	3000	3000	3000	3000	3000
3 1/2	.188	6.65	1930	2260	2710	2970	3000	3000	3000	3000	3000
3 1/2	.216 STD	7.58	2220	2500	3000	3000	3000	3000	3000	3000	3000
3 1/2	.250	8.68	2500	2500	3000	3000	3000	3000	3000	3000	3000
3 1/2	.281	9.66	2500	2500	3000	3000	3000	3000	3000	3000	3000
3 1/2	.300 XH	10.25	2500	2500	3000	3000	3000	3000	3000	3000	3000
3 1/2	.600 XXH	18.58	2500	2500	3000	3000	3000	3000	3000	3000	
4	.083	3.47	750	870	1050	1150	1290	1390	1490	1620	1740
4	.109	4.53	980	1140	1370	1500	1700	1830	1960	2130	2290

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
4	.125	5.17	1120	1310	1580	1720	1950	2100	2250	2440	2630
4	.141	5.81	1270	1480	1780	1950	2200	2370	2540	2750	2960
4	.156	6.40	1400	1640	1970	2150	2430	2620	2810	3000	3000
4	.172	7.03	1550	1810	2170	2370	2680	2890	3000	3000	3000
4	.188	7.65	1690	1970	2370	2590	2930	3000	3000	3000	3000
4	.226	9.11	2030	2370	2850	3000	3000	3000	3000	3000	3000
4	.226 STD	9.11	2030	2370	2850	3000	3000	3000	3000	3000	3000
4	.250	10.01	2250	2620	3000	3000	3000	3000	3000	3000	3000
4	.281	11.16	2530	2800	3000	3000	3000	3000	3000	3000	3000
4	.318 XH	12.50	2800	2800	3000	3000	3000	3000	3000	3000	3000
4 1/2	.083	3.92	660	770	930	1020	1150	1240	1330	1440	1590
4 1/2	.109	5.11	870	1020	----	----	----	----	2000	2170	2330
4 1/2	.125	5.84	1000	1170	1400	1530	1730	1870	2260	2440	2630
4 1/2	.141	6.56	1130	1320	1580	1730	1960	2110	2500	2700	2910
4 1/2	.156	7.24	1250	1460	1750	1910	2160	2330	2750	2980	3000
4 1/2	.172	7.95	1380	1610	1930	2110	2390	2570	3000	3000	3000
4 1/2	.188	8.66	1500	1750	2110	2310	2610	2810	3000	3000	3000
4 1/2	.203	9.32	1620	1890	2270	2490	2810	3000	3000	3000	3000
4 1/2	.219	10.01	1750	2046	2450	2690	3000	3000	3000	3000	3000
4 1/2	.237	10.79	1900	2210	2650	2910	3000	3000	3000	3000	3000
4 1/2	.250	11.35	2000	2330	2800	3000	3000	3000	3000	3000	3000
4 1/2	.281	12.66	2250	2620	3000	3000	3000	3000	3000	3000	3000
4 1/2	.312	13.96	2500	2800	3000	3000	3000	3000	3000	3000	3000
4 1/2	.337	14.98	2700	2800	3000	3000	3000	3000	3000	3000	3000
4 1/2	.438	19.00	2800	2800	3000	3000	3000	3000	3000	3000	3000
4 1/2	.531	22.51	2800	2800	3000	3000	3000	3000	3000	3000	3000
4 1/2	.674	27.54	2800	2800	3000	3000	3000	3000	3000	3000	3000
5 9/16	.250 STD	4.86	540	630	----	----	----	----	----	----	----
5 9/16	.276 XH	5.49	610	710	1060	1170	1320	----	----	----	----
5 9/16	.109	6.35	710	820	1230	1350	1530	----	----	----	----
5 9/16	.125	7.26	810	940	1420	1550	1750	----	----	----	----
5 9/16	.141	8.16	910	1060	1600	1750	1980	----	----	----	----
5 9/16	.156	9.01	1010	1180	1770	1930	2190	----	----	----	----
5 9/16	.188	10.79	1220	1420	2130	2330	2640	----	----	----	----
5 9/16	.219	12.5	1420	1650	2480	2720	3000	3000	3000	----	----
5 9/16	.258 STD	14.62	1670	1950	2920	3000	3000	3000	3000	----	----
5 9/16	.281	15.85	1820	2120	3000	3000	3000	3000	3000	----	----
5 9/16	.312	17.50	2020	2360	3000	3000	3000	3000	3000	----	----
5 9/16	.344	19.17	2230	2600	3000	3000	3000	3000	3000	----	----
5 9/16	.375 XH	20.78	2430	2800	3000	3000	3000	3000	3000	----	----
5 9/16	.500	27.04	2800	2800	3000	3000	3000	----	----	----	----
5 9/16	.625	32.96	2800	2800	3000	3000	3000	----	----	----	----

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
5 9/16	.750 XXH	38.55	2800	2800	3000	3000	3000	----	----	----	----
5 9/16	.875	43.81	2800	2800	3000	3000	3000	----	----	----	----
5 9/16	.938	46.33	2800	2800	3000	3000	3000	----	----	----	----
6 5/8	.083	5.80	450	530	790	860	980	1050	1130	12520	1320
6 5/8	.109	7.59	590	690	1040	1140	1280	1380	1480	1600	1730
6 5/8	.125	8.68	680	790	1190	1300	1470	1580	1700	1840	1980
6 5/8	.141	9.76	770	890	1340	1470	1660	1790	1920	2080	2230
6 5/8	.156	10.78	850	990	1480	1620	1840	1980	2120	2300	2470
6 5/8	.172	11.58	930	1090	1640	1790	2030	2180	2340	2530	2730
6 5/8	.188	12.92	1020	1190	1790	1960	2210	2380	2550	2770	2980
6 5/8	.203	13.92	1100	1290	1930	2110	2390	2570	2760	2990	3000
6 5/8	.219	14.98	1190	1390	2080	2280	2580	2780	2980	3000	3000
6 5/8	.250	17.02	1360	1580	2380	2600	2940	3000	3000	3000	3000
6 5/8	.280 STD	18.97	1520	1780	2660	2620	3000	3000	3000	3000	3000
6 5/8	.312	21.04	1700	1980	2970	3000	3000	3000	3000	3000	3000
6 5/8	.344	23.08	1870	2180	3000	3000	3000	3000	3000	3000	3000
6 5/8	.375	28.03	2040	2380	3000	3000	3000	3000	3000	3000	3000
6 5/8	.432 XH	28.57	2350	2740	3000	3000	3000	3000	3000	3000	3000
6 5/8	.500	32.71	2720	2800	3000	3000	3000	3000	3000	3000	3000
6 5/8	.562	36.39	2800	2800	3000	3000	3000	3000	3000	3000	3000
6 5/8	.625	40.05	2800	2800	3000	3000	3000	3000	3000	3000	3000
6 5/8	.719	45.35	2800	2800	3000	3000	3000	3000	3000	3000	3000
6 5/8	.864 XXH	53.16	2800	2800	3000	3000	3000	3000	3000	3000	3000
6 5/8	1.000	60.07	2800	2800	3000	3000	3000	3000	3000	3000	3000
6 5/8	1.125	66.08	2800	2800	3000	3000	3000	3000	3000	3000	3000
8 5/8	.125	11.35	520	610	910	1000	1130	1220	1300	1410	1520
8 5/8	.156	14.11	650	760	1140	1250	1410	1520	1630	1760	1900
8 5/8	.188	16.94	780	920	1370	1500	1700	1830	1960	2130	2290
8 5/8	.219	19.66	910	1070	1600	1750	1980	2130	2290	2480	2670
8 5/8	.250	22.36	1040	1220	1830	2000	2260	2430	2610	2830	3000
8 5/8	.277 STD	24.70	1160	1350	2020	2220	2510	2700	2890	3000	3000
8 5/8	.312	27.70	1300	1520	2280	2500	2820	3000	3000	3000	3000
8 5/8	.322 STD	28.55	1340	1570	2350	2580	2910	3000	3000	3000	3000
8 5/8	.344	30.42	1440	1680	2510	2750	3000	3000	3000	3000	3000
8 5/8	.375	33.04	1570	1830	2740	3000	3000	3000	3000	3000	3000
8 5/8	.438	38.30	1830	2130	3000	3000	3000	3000	3000	3000	3000
8 5/8	.500 XH	43.39	2090	2430	3000	3000	3000	3000	3000	3000	3000
8 5/8	.562	48.40	2350	2740	3000	3000	3000	3000	3000	3000	3000
8 5/8	.625	53.40	2610	2800	3000	3000	3000	3000	3000	3000	3000
8 5/8	.719	60.71	2800	2800	3000	3000	3000	3000	3000	3000	3000
8 5/8	.875 XXH	72.42	2800	2800	3000	3000	3000	----	3000	3000	3000

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
10 3/4	.156	17.65	520	610	1040	1130	1280	1380	1480	1600	1730
10 3/4	.188	21.21	630	730	1250	1370	1550	1660	1780	1930	2080
10 3/4	.203	22.87	850	800	1350	1480	1670	1800	1930	2090	2250
10 3/4	.219	24.63	730	860	1450	1590	1800	1940	2080	2250	2420
10 3/4	.250	28.04	840	980	1660	1820	2060	2210	2370	2570	2770
10 3/4	.279 STD	31.20	930	1090	1850	2030	2290	2470	2650	2870	3000
10 3/4	.307	34.24	1030	1200	2040	2230	2520	2720	2910	3000	3000
10 3/4	.344	38.23	1150	1340	2280	2500	2830	3000	3000	3000	3000
10 3/4	.365 STD	40.48	1220	1430	2420	2660	3000	3000	3000	3000	3000
10 3/4	.438	48.24	1470	1710	2910	3000	3000	3000	3000	3000	3000
10 3/4	.500 XH	54.74	1670	1950	3000	3000	3000	3000	3000	3000	3000
10 3/4	.562	61.15	1880	2200	3000	3000	3000	3000	3000	3000	3000
10 3/4	.625	67.58	2090	2440	3000	3000	3000	3000	3000	3000	3000
10 3/4	.719	77.03	2410	2800	3000	3000	3000	3000	3000	3000	3000
10 3/4	.812	86.18	2720	2800	3000	3000	3000	-----	-----	-----	-----
12 3/4	.172	23.11	490	570	960	1050	1190	1280	1380	1490	1610
12 3/4	.188	25.22	530	620	1050	1150	1300	1400	1500	1630	1750
12 3/4	.203	27.20	720	670	1140	1250	1410	1520	1620	1760	1890
12 3/4	.219	29.31	620	720	1230	1340	1520	1640	1750	1900	2040
12 3/4	.250	33.38	710	820	1400	1530	1730	1870	2000	2170	2330
12 3/4	.281	37.42	790	930	1570	1720	1950	2100	2250	2440	2620
12 3/4	.312	41.45	880	1030	1750	1910	2160	2330	2500	2700	2910
12 3/4	.330 STD	43.77	930	1090	1850	2020	2290	2460	2640	2860	3000
12 3/4	.344	45.58	970	1130	1930	2110	2390	2570	2750	2980	3000
12 3/4	.375 STD	49.56	1060	1240	2100	2300	2600	2800	3000	3000	3000
12 3/4	.406	43.52	1430	1670	2270	2490	2810	3000	3000	3000	3000
12 3/4	.438	57.59	1240	1440	2450	2690	3000	3000	3000	3000	3000
12 3/4	.500 XH	65.42	1410	1650	2800	3000	3000	3000	3000	3000	3000
12 3/4	.562	73.15	1590	1850	3000	3000	3000	3000	3000	3000	3000
12 3/4	.625	80.93	1760	2060	3000	3000	3000	3000	3000	3000	3000
12 3/4	.688	88.63	1940	2270	3000	3000	3000	3000	3000	3000	3000
12 3/4	.750	96.12	2120	2470	3000	3000	3000	3000	3000	3000	3000
12 3/4	.812	103.53	2290	2670	3000	3000	3000	3000	3000	3000	3000
12 3/4	.875	110.87	2470	2800	3000	3000	3000	3000	3000	3000	3000
14	.188	27.73	480	560	960	1050	1190	1280	1370	1480	1600
14	.203	29.91	520	610	1040	1130	1280	1380	-----	-----	-----
14	.210	30.93	670	790	1070	1170	1330	1430	1530	1660	1790
14	.219	32.23	700	660	1120	1220	1380	1490	1600	1730	1860
14	.250	36.71	640	750	1280	1400	1580	1700	1820	1970	2130
14	.281	41.17	720	840	1430	1570	1770	1910	2050	2220	2390
14	.312	45.61	800	940	1590	1740	1970	2120	2270	2460	2650
14	.344	50.17	880	1030	1750	1920	2170	2340	2510	2720	2920

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
14	.375	54.57	960	1120	1910	2090	2370	2550	2730	2960	3000
14	.406	58.94	1300	1520	2070	2270	2560	2760	2960	3000	3000
14	.438	63.44	1130	1310	2230	2450	2770	2980	3000	3000	3000
14	.469	67.78	1510	1760	2390	2620	2960	3000	3000	3000	3000
14	.500	72.09	1290	1500	2550	2790	3000	2800	3000	3000	3000
14	.562	80.66	1450	1690	2870	3000	3000	3000	3000	3000	3000
14	.625	89.28	1610	1880	3000	3000	3000	3000	3000	3000	3000
14	.688	97.81	1770	2060	3000	3000	3000	3000	3000	3000	3000
14	.750	106.13	1930	2250	3000	3000	3000	3000	3000	3000	3000
14	.812	114.37	2090	2440	3000	3000	3000	3000	3000	3000	3000
14	.875	122.65	2250	2620	3000	3000	3000	3000	3000	3000	3000
14	.938	130.85	2410	2800	3000	3000	3000	3000	3000	3000	3000
16	.188	31.75	420	490	840	920	1040	1120	1200	1300	1400
16	.203	34.25	460	530	910	990	1120	1210	1290	1400	1510
16	.219	36.91	490	570	980	1070	1210	1300	1400	1510	1630
16	.250	42.05	560	660	1120	1220	1380	1490	1590	1730	1860
16	.281	47.17	630	740	1250	1370	1550	1670	1790	1940	2090
16	.312	52.27	700	820	1390	1520	1720	1860	1990	2150	2320
16	.344	57.52	770	900	1540	1680	1900	2050	2190	2380	2560
16	.375	62.58	840	980	1670	1830	2070	2230	2390	2590	2790
16	.406	67.62	1140	1330	1810	1980	2240	2420	2590	2800	3000
16	.438	72.80	990	1150	1950	2140	2420	2610	2790	3000	3000
16	.469	77.79	1320	1540	2090	2290	2590	2790	2990	3000	3000
16	.500	82.77	1120	1310	2230	2440	2760	2980	3000	3000	3000
16	.562	92.66	1260	1480	2510	2750	3000	3000	3000	3000	3000
16	.625	102.63	1410	1640	2790	3000	3000	3000	3000	3000	3000
16	.688	112.51	1550	1810	3000	3000	3000	3000	3000	3000	3000
16	.750	122.15	1690	1970	3000	3000	3000	3000	3000	3000	3000
16	.812	131.71	1830	2130	3000	3000	3000	3000	3000	3000	3000
16	.875	141.34	1970	2300	3000	3000	3000	3000	3000	3000	3000
16	.938	150.89	2110	2460	3000	3000	3000	3000	3000	3000	3000
16	1.000	160.20	2250	2620	3000	3000	3000	3000	3000	3000	3000
16	1.062	169.43	2390	2790	3000	3000	3000	3000	3000	3000	3000
16	1.125	178.72	2530	2800	3000	3000	3000	3000	3000	3000	3000
18	.188	35.76	380	440	750	820	920	990	1070	1150	1240
18	.219	41.56	440	510	870	950	1080	1160	1240	1340	1450
18	.250	47.39	500	580	990	1090	1230	1320	1420	1530	1650
18	.281	53.18	560	660	1110	1220	1380	1490	1590	1730	1860
18	.312	58.94	620	730	1240	1360	1530	1650	1770	1920	2060
18	.344	64.87	690	800	1360	1490	1690	1820	1950	2110	2270
18	.375	70.59	750	880	1490	1630	1840	1980	2120	2300	2480
18	.406	76.29	1010	1180	1610	1760	1990	2150	2300	2490	2680

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
18	.438	82.15	880	1020	1740	1900	2150	2320	2480	2690	2900
18	.469	87.81	1170	1370	1860	2040	2300	2480	2660	2880	3000
18	.500	93.45	1000	1170	1980	2170	2460	2640	2830	3000	3000
18	.562	104.67	1120	1310	2230	2440	2760	2970	3000	3000	3000
18	.625	115.98	1250	1460	2480	2720	3000	3000	3000	3000	3000
18	.688	127.21	1380	1610	2730	2990	3000	3000	3000	3000	3000
18	.750	138.17	1500	1750	2730	2990	3000	3000	3000	3000	3000
18	.812	149.06	1620	1890	3000	3000	3000	3000	3000	3000	3000
18	.875	160.03	1750	2040	3000	3000	3000	3000	3000	3000	3000
18	.938	170.92	1880	2190	3000	3000	3000	3000	3000	3000	3000
18	1.000	181.56	2000	2330	3000	3000	3000	3000	3000	3000	3000
18	1.062	192.11	2120	2480	3000	3000	3000	3000	3000	3000	3000
18	1.125	202.75	2250	2620	3000	3000	3000	3000	3000	3000	3000
18	1.187	213.14	2370	2770	3000	3000	3000	3000	3000	3000	3000
18	1.256	223.61	2500	2800	3000	3000	3000	3000	3000	3000	3000
20	.219	46.27	390	460	830	910	1020	1100	1180	1280	1380
20	.250	52.73	450	520	940	1040	1170	1260	1350	1460	1580
20	.281	56.18	510	590	1060	1160	1320	1420	1520	1640	1770
20	.312	65.60	560	660	1180	1290	1460	1570	1680	1830	1970
20	.344	72.21	620	720	1300	1420	1610	1730	1860	2010	2170
20	.375	78.60	680	790	1420	1550	1760	1890	2020	2190	2360
20	.406	84.96	910	1070	1530	1680	1900	2050	2190	2380	2560
20	.438	91.51	790	920	1660	1810	2050	2210	2370	2560	2750
20	.469	97.83	960	1120	1770	1940	2190	2360	2530	2740	2750
20	.500	104.13	900	1050	1890	2070	2340	2520	2700	2750	2750
20	.562	116.67	1010	1260	2330	2630	2630	2750	2750	2750	2750
20	.625	129.33	1120	1310	2360	2590	2750	2750	2750	2750	2750
20	.688	141.90	1240	1440	2600	2750	2750	2750	2750	2750	2750
20	.750	154.19	1350	1580	2750	2750	2750	2750	2750	2750	2750
20	.812	166.40	1460	1710	2750	2750	2750	2750	2750	2750	2750
20	.875	178.72	1580	1840	2750	2750	2750	2750	2750	2750	2750
20	.938	190.96	1690	1970	2750	2750	2750	2750	2750	2750	2750
20	1.000	202.92	1800	2100	2750	2750	2750	2750	2750	2750	2750
20	1.062	214.80	1910	2230	2750	2750	2750	2750	2750	2750	2750
20	1.125	226.78	2020	2360	2750	2750	2750	2750	2750	2750	2750
20	1.187	238.50	2140	2490	2750	2750	2750	2750	2750	2750	2750
20	1.250	250.31	2250	2620	2750	2750	2750	2750	2750	2750	2750
20	1.312	261.86	2360	2750	2750	2750	2750	2750	2750	2750	2750
20	1.375	273.51	2480	2750	2750	2750	2750	2750	2750	2750	2750
22	.219	50.94	360	420	750	820	930	1000	1080	1160	1250
22	.250	58.07	410	480	860	940	1060	1150	1230	1330	1430

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
22	.281	65.18	460	540	970	1060	1200	1290	1380	1490	1610
22	.312	72.27	510	600	1070	1170	1330	1430	1530	1660	1790
22	.344	79.56	560	660	1180	1290	1460	1580	1690	1830	1970
22	.375	86.61	610	720	1290	1410	1600	1720	1840	1990	2150
22	.406	93.63	830	970	1400	1530	1730	1860	1990	2160	2330
22	.438	100.86	720	840	1510	1650	1860	2010	2150	2330	2500
22	.469	107.85	960	1120	1610	1770	2000	2150	2300	2490	2500
22	.500	114.81	820	950	1720	1880	2130	2290	2450	2500	2500
22	.562	128.67	920	1070	1930	2120	2390	2500	2500	2500	2500
22	.625	142.68	1020	1190	2150	2350	2500	2500	2500	2500	2500
22	.688	156.60	1130	1310	2360	2500	2500	2500	2500	2500	2500
22	.750	170.21	1230	1430	2500	2500	2500	2500	2500	2500	2500
22	.812	183.75	1330	1550	2500	2500	2500	2500	2500	2500	2500
22	.875	197.41	1430	1670	2500	2500	2500	2500	2500	2500	2500
22	.938	211.00	1530	1790	2500	2500	2500	2500	2500	2500	2500
22	1.000	224.28	1640	1910	2500	2500	2500	2500	2500	2500	2500
22	1.062	237.48	1740	2030	2500	2500	2500	2500	2500	2500	2500
22	1.125	250.81	1840	2150	2500	2500	2500	2500	2500	2500	2500
22	1.188	264.06	----	----	2500	2500	2500	2500	2500	2500	2500
22	1.250	277.01	2050	2390	2500	2500	2500	2500	2500	2500	2500
22	1.312	289.88	2150	2500	2500	2500	2500	2500	2500	2500	2500
22	1.375	302.88	2250	2500	2500	2500	2500	2500	2500	2500	2500
22	1.437	315.58	2350	2500	2500	2500	2500	2500	2500	2500	2500
22	1.500	328.41	2450	2500	2500	2500	2500	2500	2500	2500	2500
24	.250	63.41	380	440	790	860	980	1050	1120	1220	1310
24	.281	71.18	420	490	890	970	1100	1180	1260	1370	1480
24	.312	78.93	470	550	980	1080	1220	1310	1400	1520	1640
24	.344	86.91	520	600	1080	1190	1340	1440	1550	1680	1810
24	.375	94.62	560	660	1180	1290	1460	1580	1690	1830	1970
24	.406	102.31	610	710	1280	1400	1580	1710	1830	1980	2130
24	.438	110.22	660	770	1380	1510	1710	1840	1970	2140	2300
24	.469	117.86	700	820	1480	1620	1830	1970	2110	2290	2300
24	.500	125.49	750	880	1580	1720	1950	2100	2250	2300	2300
24	.562	140.68	840	980	1770	1940	2190	2300	2300	2300	2300
24	.625	156.03	940	1090	1970	2160	2300	2300	2300	2300	2300
24	.688	171.29	1030	1200	2170	2300	2300	2300	2300	2300	2300
24	.750	186.23	1120	1310	2300	2300	2300	2300	2300	2300	2300
24	.812	201.09	1220	1420	2300	2300	2300	2300	2300	2300	2300
24	.875	216.10	1310	1530	2300	2300	2300	2300	2300	2300	2300
24	.938	231.03	1410	1640	2300	2300	2300	2300	2300	2300	2300
24	1.000	245.64	1500	1750	2300	2300	2300	2300	2300	2300	2300
24	1.062	260.17	1590	1860	2300	2300	2300	2300	2300	2300	2300
24	1.125	274.84	1690	1970	2300	2300	2300	2300	2300	2300	2300

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
24	1.187	289.20	1780	2080	2300	2300	2300	2300	2300	2300	2300
24	1.250	303.71	1880	2190	2300	2300	2300	2300	2300	2300	2300
24	1.312	317.91	1970	2300	2300	2300	2300	2300	2300	2300	2300
24	1.375	332.25	2060	2300	2300	2300	2300	2300	2300	2300	2300
24	1.437	346.28	2160	2300	2300	2300	2300	2300	2300	2300	2300
24	1.500	360.45	2250	2300	2300	2300	2300	2300	2300	2300	2300
24	1.562	374.31	2300	2300	2300	2300	2300	2300	2300	2300	2300
26	.250	68.75	350	400	730	800	900	970	1040	1120	1210
26	.281	77.18	390	450	820	890	1010	1090	1170	1260	1360
26	.312	85.60	430	500	910	990	1120	1210	1300	1400	1510
26	.344	94.26	480	560	1000	1100	1240	1330	1430	1550	1670
26	.375	102.63	520	610	1090	1190	1350	1450	1560	1690	1820
26	.406	110.98	700	820	1180	1290	1460	1570	1690	1830	1970
26	.438	119.57	610	710	1270	1390	1580	1700	1820	1970	2000
26	.469	127.88	810	950	1360	1490	1690	1820	1950	2000	2000
26	.500	136.17	690	810	1450	1590	1800	1940	2000	2000	2000
26	.562	152.68	780	910	1630	1790	2000	2000	2000	2000	2000
26	.625	169.38	870	1010	1820	1990	2000	2000	2000	2000	2000
26	.688	185.99	950	1110	2000	2000	2000	2000	2000	2000	2000
26	.750	202.25	1040	1210	2000	2000	2000	2000	2000	2000	2000
26	.812	218.43	1120	1310	2000	2000	2000	2000	2000	2000	2000
26	.875	234.79	1210	1410	2000	2000	2000	2000	2000	2000	2000
26	.938	251.07	1300	1520	2000	2000	2000	2000	2000	2000	2000
26	1.000	267.00	1380	1620	2000	2000	2000	2000	2000	2000	2000
28	.250	74.09	320	370	680	740	840	900	960	1040	1130
28	.281	83.19	360	420	760	830	940	1010	1080	1170	1260
28	.312	92.26	400	470	840	920	1040	1120	1200	1300	1400
28	.344	101.61	----	----	930	1020	1150	1240	1330	1440	1550
28	.375	110.64	480	560	1010	1110	1250	1350	1450	1570	1690
28	.406	119.65	----	---	1100	1200	1360	1460	1570	1700	1830
28	.438	128.93	560	660	1180	1300	1460	1580	1690	1830	1970
28	.469	137.90	----	----	1270	1390	1570	1690	1810	1960	2110
28	.500	146.85	640	750	1350	1480	1670	1800	1930	2090	2250
28	.562	164.69	720	840	1520	1660	1880	2020	2170	2350	2530
28	.625	182.73	800	940	1690	1850	2090	2250	2410	2610	2810
28	.688	200.68	880	1030	1860	2030	2300	2480	2650	2870	3000
28	.750	218.27	960	1120	2020	2220	2510	2700	2890	3000	3000
28	.812	235.78	1040	1220	2190	2400	2710	2920	3000	3000	3000
28	.875	253.48	1120	1310	2360	2590	2920	3000	3000	3000	3000
28	.938	271.10	1210	1410	2530	2770	3000	3000	3000	3000	3000
28	1.000	288.36	1290	1500	2700	2960	3000	3000	3000	3000	3000

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
30	.250	79.43	300	350	630	690	780	840	900	980	1050
30	.281	89.19	340	390	710	780	880	940	1010	1100	1180
30	.312	98.93	370	440	790	860	970	1050	1120	1220	1310
30	.344	108.95	520	600	870	950	1070	1160	1240	1340	1440
30	.375	118.65	450	520	940	1040	1170	1260	1350	1460	1580
30	.406	128.32	610	710	1020	1120	1270	1360	1460	1580	1710
30	.438	138.29	530	610	1100	1210	1370	1470	1580	1710	1840
30	.469	147.92	560	660	1180	1290	1460	1580	1690	1830	1970
30	.500	157.53	600	700	1260	1380	1560	1680	1800	1950	2100
30	.562	176.69	670	790	1420	1550	1750	1890	2020	2190	2360
30	.625	196.08	750	880	1580	1720	1950	2100	2250	2440	2630
30	.688	215.38	830	960	1730	1900	2150	2310	2480	2680	2890
30	.750	234.29	900	1050	1890	2070	2340	2520	2700	2920	3000
30	.812	253.12	970	1140	2050	2240	2530	2730	2920	3000	3000
30	.875	272.17	1050	1220	2200	2420	2730	2940	3000	3000	3000
30	.938	291.14	1130	1310	2360	2590	2930	3000	3000	3000	3000
30	1.000	309.72	1200	1400	2520	2760	3000	3000	3000	3000	3000
32	.250	84.77	280	330	590	650	730	790	840	910	980
32	.281	95.19	320	370	660	730	820	890	950	1030	1110
32	.312	105.59	350	410	740	810	910	980	1050	1140	1230
32	.344	116.30	560	480	810	890	1010	1080	1160	1260	1350
32	.375	126.66	420	490	890	970	1100	1180	1270	1370	1480
32	.406	136.99	450	530	960	1050	1190	1280	1370	1480	1600
32	.438	147.64	490	570	1030	1130	1280	1380	1480	1600	1720
32	.469	157.94	520	620	1110	1210	1370	1480	1580	1710	1850
32	.500	168.21	560	660	1180	1290	1460	1580	1690	1830	1970
32	.562	188.70	630	740	1330	1450	1640	1770	1900	2050	2210
32	.625	209.43	700	820	1480	1620	1830	1970	2110	2290	2460
32	.688	230.08	770	900	1630	1780	2010	2170	2320	2520	2710
32	.750	250.31	840	980	1770	1940	2190	2360	2530	2740	2950
32	.812	270.47	910	1070	1920	2100	2380	2560	2740	2970	3000
32	.875	290.86	980	1150	2070	2260	2560	2760	2950	3000	3000
32	.938	311.17	1060	1230	2220	2430	2740	2950	3000	3000	3000
32	1.00	331.08	1120	1310	2360	2590	2920	3000	3000	3000	3000
34	.250	90.11	260	310	560	610	690	740	790	860	930
34	.281	101.19	300	350	620	680	770	830	890	970	1040
34	.312	112.25	330	390	690	760	860	920	990	1070	1160
34	.344	123.65	460	530	760	840	950	1020	1090	1180	1270
34	.375	134.67	400	460	830	910	1030	1110	1190	1290	1390
34	.406	145.67	430	500	900	990	1120	1200	1290	1400	1500
34	.438	157.00	460	540	970	1070	1210	1300	1390	1510	1620

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
34	.469	167.95	490	580	1040	1140	1290	1390	1490	1610	1740
34	.500	178.89	530	620	1100	1220	1380	1480	1590	1720	1850
34	.562	200.70	600	690	1250	1370	1550	1670	1790	1930	2080
34	.625	222.78	660	770	1390	1520	1720	1850	1990	2150	2320
34	.688	244.77	730	850	1530	1680	1890	2040	2190	2370	2550
34	.750	266.33	790	930	1670	1830	2060	2220	2380	2580	2780
34	.812	287.81	860	1000	1810	1980	2240	2210	2580	2790	3000
34	.875	309.55	930	1080	1950	2130	2410	2590	2780	3000	3000
34	.938	331.21	990	1160	2090	2280	2580	2780	2980	3000	3000
34	1.00	352.44	1060	1240	2220	2440	2750	2960	3000	3000	3000
36	.250	95.45	250	290	520	580	650	700	750	810	880
36	.281	107.20	280	330	590	650	730	790	840	910	980
36	.312	118.92	310	360	660	720	810	870	940	1010	1090
36	.344	131.00	430	500	720	790	890	960	1030	1120	1200
36	.375	142.68	380	440	790	860	980	1050	1120	1220	1310
36	.406	154.34	410	480	850	930	1060	1140	1220	1320	1420
36	.438	166.35	440	510	920	1010	1140	1230	1310	1420	1530
36	.469	177.97	470	550	980	1080	1220	1310	1410	1520	1640
36	.500	189.57	500	580	1050	1150	1300	1400	1500	1620	1750
36	.562	212.70	560	660	1180	1290	1460	1570	1690	1830	1970
36	.625	236.13	620	730	1310	1440	1620	1750	1880	2030	2190
36	.688	259.47	690	800	1440	1580	1790	1930	2060	2240	2410
36	.750	282.35	750	880	1580	1720	1950	2100	2250	2440	2630
36	.812	305.16	810	950	1710	1870	2110	2270	2440	2640	2840
36	.875	328.24	880	1020	1840	2010	2280	2450	2620	2840	3000
36	.938	351.25	940	1090	1970	2160	2440	2630	2810	3000	3000
36	1.00	373.80	1000	1170	2100	2300	2600	2800	3000	3000	3000
38	.312	125.58	300	340	620	680	770	830	890	960	1030
38	.344	138.35	330	380	680	750	850	910	980	1060	1140
38	.375	150.69	360	410	750	820	920	990	1070	1150	1240
38	.406	163.01	380	450	810	880	1000	1080	1150	1250	1350
38	.438	175.71	410	480	870	950	1080	1160	1240	1350	1450
38	.469	187.99	440	520	930	1020	1160	1240	1330	1440	1560
38	.500	200.25	470	550	990	1090	1230	1330	1420	1540	1660
38	.562	224.71	530	620	1120	1220	1380	1490	1600	1730	1860
38	.625	249.48	590	690	1240	1360	1540	1560	1780	1920	2070
38	.688	274.16	650	760	1370	1500	1690	1830	1960	2120	2280
38	.750	298.37	710	830	1490	1630	1850	1990	2130	2310	2490
38	.812	322.50	770	900	1620	1770	2000	2150	2310	2500	2690
38	.875	346.93	830	970	1740	1910	2160	2320	2490	2690	2900
38	.938	371.28	890	1040	1870	2040	2310	2490	2670	2890	3000
38	1.00	395.16	950	1110	1990	2180	2460	2650	2840	3000	3000

Outside Diameter (Inches)	Wall Thickness (Inches)	Weight per Foot (lbs)	Test Pressure (PSI)								
			Grade A	Grade B	Grade X-42	Grade X-46	Grade X-52	Grade X-56	Grade X-60	Grade X-65	Grade X-70
40	.312	132.25	280	330	590	650	730	790	840	910	980
40	.344	145.69	310	360	650	710	800	870	930	1010	1080
40	.375	158.70	340	390	710	780	880	940	1010	1100	1180
40	.406	17.68	370	430	770	840	950	1020	1100	1190	1280
40	.438	185.06	390	460	830	910	1020	1100	1180	1280	1380
40	.469	198.01	420	490	890	970	1100	1180	1270	1370	1480
40	.500	210.93	450	520	940	1040	1170	1260	1350	1460	1580
40	.562	236.71	510	590	1060	1160	1320	1420	1520	1640	1770
40	.625	262.83	560	660	1180	1290	1460	1580	1690	1830	1970
40	.688	288.86	620	720	1300	1420	1610	1730	1860	2010	2170
40	.750	314.39	680	790	1420	1550	1760	1890	2020	2190	2360
40	.812	339.84	730	850	1530	1680	1900	2050	2190	2380	2560
40	.875	365.62	790	920	1650	1810	2050	2200	2160	2560	2760
40	.938	391.32	840	980	1770	1940	2190	2360	2530	2740	2950
40	1.00	416.52	900	1050	7890	2070	2340	2520	2700	2920	3000
42	.344	153.04	290	340	620	680	770	830	880	960	1030
42	.375	166.71	320	380	680	740	840	900	960	1040	1130
42	.406	180.35	350	410	730	800	900	970	1040	1130	1220
42	.438	194.42	380	440	790	860	980	1050	1130	1220	1310
42	.469	203.03	400	470	840	920	1050	1130	1210	1310	1410
42	.500	221.61	430	500	900	990	1110	1200	1290	1390	1500
42	.562	248.72	480	560	1010	1110	1250	1350	1450	1570	1690
42	.625	276.18	540	620	1120	1230	1390	1500	1610	1740	1880
42	.688	303.55	590	690	1240	1360	1530	1650	1770	1920	2060
42	.750	330.41	640	750	1350	1480	1670	1800	1930	2090	2250
42	.812	357.19	700	810	1460	1600	1810	1950	2090	2260	2440
42	.875	384.31	750	880	1580	1720	1950	2100	2250	2440	2630
42	.938	411.35	800	940	1690	1850	2090	2250	2410	2610	2810
42	1.00	437.88	860	1000	1800	1970	2230	2400	2570	2790	3000

MECHANICAL PROPERTIES AND CHEMICAL REQUIREMENTS

API 5L Grade	ISO 3183 Grade	Yield Strength		Tensile Strength		CVN ² Min. ft-lbs	Elongation Min. %	C Max. %	Mn Max. %	P Max. %	S Max. %	Cb Min. %	V Min. %	CE ⁴ Max.
		Min. ksi	Max. ¹ kxi	Min. ksi	Max. ¹ ksi									
B	L240	35	65 ⁵	60	110	20	API Formula ³	0.22	1.10	0.025	0.010	—	—	0.43
X42	L290	42	72	60	110	20	API Formula ³	0.22	1.10	0.025	0.010	—	—	0.43
X46	L320	46	76	63	110	20	API Formula ³	0.22	1.35	0.025	0.010	—	—	0.43
X52	L360	52	77	66	110	20	API Formula ³	0.22	1.35	0.025	0.010	0.010	0.010	0.43
X56	L390	56	79	71	110	20	API Formula ³	0.22	1.35	0.025	0.010	0.010	0.010	0.43
X60	L415	60	82	75	110	20	API Formula ³	0.22	1.40	0.025	0.010	0.010	0.010	0.43
X65	L450	65	87	77	110	20	API Formula ³	0.22	1.45	0.025	0.010	0.010	0.010	0.43
X70	L480	70	90	82	110	20	API Formula ³	0.22	1.65	0.025	0.010	0.010	0.010	0.43

Lone Star Steel's line pipe chemistry requirements are within those of American Petroleum Institute Specification 5L.

1. API 5L PSL 2 only.
2. API 5L PSL 2 only. Minimums are 20 ft-lbs (FS, TB, 32F) or 30 ft-lbs (FS, LB, 32F).
3. API minimum elongation (%) in 2 inches equals $625,000 \cdot (A^2/U^2)$ where A is the cross-sectional area of tensile specimen (sq. in.) and U is the specified minimum tensile strength (psi).
4. API 5L PSL 2 only. Carbon Equivalents to customers' specifications are available upon agreement.
5. 72 ksi in sizes subject to longitudinal testing.

NOTES ON DIMENSIONS, TEST PRESSURES AND DESIGN PRESSURES

Design Pressures

Design pressures are calculated from design formulas and conditions in ASME B31.4 (1992) "Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols" and ASME B31.8 (1992) "Gas Transmission and Distribution Piping Systems" where:

$$P = \frac{2 \cdot S \cdot t \cdot E \cdot T \cdot F}{D}$$

where:

- P = Design pressure, psig.
- S = Specified minimum yield, psi.
- D = Outside diameter of pipe, in.
- t = Nominal wall thickness, in.
- E = Longitudinal joint factor, E = 1 for ERW pipe (ASME B31.8 Table 841.115A).
- T = Temperature derating factor. All design pressures herein are based on operating temperatures of 250°F or less. T for other temperatures can be interpolated from ASME B31.8 Table 841.116A:

Temperature °F	Derating T
250 or less	1.000
300	.967
350	.933
400	.900
450	.867

- F = Design factor, F = .72 for nominal wall thickness (ASME B31.4) and for Location Class 1 Division 2 construction (ASME B31.8). All design pressures listed herein are for ASME B31.4 and ASME B31.8 Table 841.114A Class 1 Division 2 construction. Other design factors are:

Location Class	Design Factor F
1 Div. 1	.80
1 Div. 2	.72
2	.60
3	.50
4	.40

Nominal Size

The nominal pipe sizes are from API Specification 5L, Specification for Line Pipe 41st Edition (1995), Tables 6B and 6C. API 5L "Nominal Sizes" are not consistent with ASTM "NPS Designators". Certain diameter, wall and grade combinations are non-API.

Nominal Weight

The nominal weight is calculated:

$$W_{ps} = 10.69 \cdot (D - t) \cdot t$$

where:

- W_{ps} = Nominal weight, lbs/ft
- D = Outside diameter of pipe, in.
- t = Nominal wall thickness, in.

Weight tolerances are:

- Std, XS, XXS +10.0%, -3.5%
- Special plain-end pipe +10.0%, -5.0%

Class and Schedule Numbers

Class and schedule numbers designate pipe wall thicknesses which are considered to be standard items. Classes are: standard (Std), extra-strong (XS) and double-extra strong (XXS). ANSI Standard B36.10 schedule numbers are for reference only.

Outside Diameter Tolerances

- Pipe Body O.D. tolerances are: +.75%, -.75%
- Pipe Ends (4 in. from end)
 - 10.750 in. and smaller O.D.s: +¹/₁₆ in., -¹/₆₄ in.
 - 16.000-12.750 in. O.D.s: +³/₃₂ in., -¹/₃₂ in.

Wall Thickness Tolerance

- Pipe wall thickness tolerances are: +15.0%, -12.5%

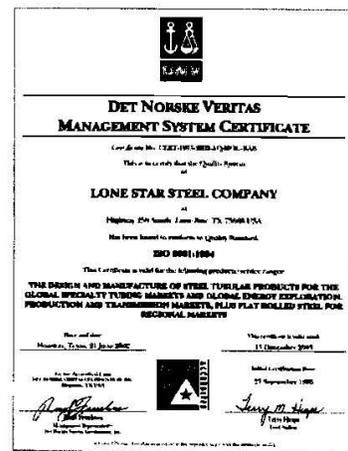
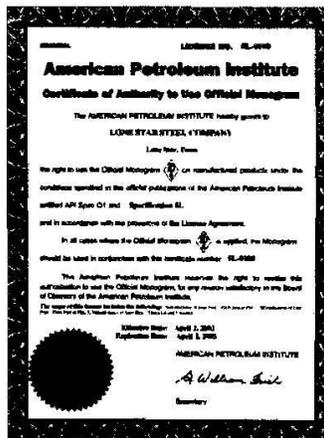
Mill Test Pressures

Mill test pressures shown are standard Lone Star Steel test pressures. All grades and sizes are tested to 90% of yield stress except for sizes 2 1/8 through 3 1/2 which have a maximum test pressure of 3000 psi which conforms to API 5L requirements. The test pressures are calculated with the formula:

$$P = \frac{2 \cdot S \cdot t \cdot 0.90}{D}$$

where:

- P = Mill test pressure, psi.
- S = Specified minimum yield strength, psi.
- D = Outside diameter, in.
- t = Nominal wall thickness, in.



DIMENSIONS, TEST PRESSURES AND DESIGN PRESSURES

Nominal Size	O.D. In.	Wall In.	I.D. In.	Weight lbs/ft	Class/Schedule	Mill Test Pressure, psi								Design Pressures, Oil and Gas - Class 1 Locations, psi								
						Gr B	X42	X48	X52	X56	X60	X65	X70	Gr B	X42	X48	X52	X56	X60	X65	X78	
2	2.375	0.109	2.157	2.64		2890	3000	3000	3000	3000	3000	3000	3000	3000	2310	2780	3040	3440	3700	3970	4300	4630
	2.375	0.125	2.125	3.01		3000	3000	3000	3000	3000	3000	3000	3000	3000	2650	3180	3490	3940	4240	4550	4930	5310
	*2.375	0.154	2.067	3.66	Std / 40	3000	3000	3000	3000	3000	3000	3000	3000	3000	3270	3920	4300	4860	5230	5600	6070	6540
	*2.375	0.218	1.939	5.03	XS / 80	3000	3000	3000	3000	3000	3000	3000	3000	3000	4630	5550	6080	6870	7400	7930	8590	9250
	*2.375	0.344	1.687	7.47	160	3000	3000	3000	3000	3000	3000	3000	3000	3000	7300	8760	9590	10850	11680	12510	13560	14600
	*2.375	0.436	1.503	9.04	XCS	3000	3000	3000	3000	3000	3000	3000	3000	3000	9250	11100	12160	13750	14800	15860	17180	18500
2 1/2	2.875	0.109	2.657	3.22		2390	2870	3000	3000	3000	3000	3000	3000	3000	1910	2290	2510	2840	3060	3280	3550	3820
	2.875	0.125	2.625	3.67		2740	3000	3000	3000	3000	3000	3000	3000	3000	2190	2630	2880	3260	3510	3760	4070	4380
	*2.875	0.203	2.469	5.80	Std / 40	3000	3000	3000	3000	3000	3000	3000	3000	3000	3560	4270	4680	5290	5690	6100	6610	7120
	*2.875	0.276	2.323	7.67	XS / 80	3000	3000	3000	3000	3000	3000	3000	3000	3000	4840	5810	6360	7190	7740	8290	8990	9680
	*2.875	0.375	2.125	10.02	160	3000	3000	3000	3000	3000	3000	3000	3000	3000	6570	7890	8640	9770	10520	11270	12210	13150
	*2.875	0.438	1.999	11.41	XCS	3000	3000	3000	3000	3000	3000	3000	3000	3000	7680	9210	10090	11410	12290	13160	14260	15360
3	3.500	0.109	3.282	3.95		1960	2350	2580	2910	3000	3000	3000	3000	1570	1880	2060	2330	2510	2690	2910	3140	
	3.500	0.125	3.250	4.51		2250	2700	2960	3000	3000	3000	3000	3000	1800	2160	2370	2670	2880	3090	3340	3600	
	3.500	0.141	3.218	5.06		2540	3000	3000	3000	3000	3000	3000	3000	2030	2440	2670	3020	3250	3480	3770	4060	
	3.500	0.156	3.188	5.58		2810	3000	3000	3000	3000	3000	3000	3000	2250	2700	2950	3340	3590	3850	4170	4490	
	*3.500	0.188	3.124	6.66		3000	3000	3000	3000	3000	3000	3000	3000	2710	3250	3560	4020	4310	4640	5030	5410	
	*3.500	0.216	3.068	7.58	Std / 40	3000	3000	3000	3000	3000	3000	3000	3000	3110	3730	4090	4620	4980	5330	5780	6220	
	*3.500	0.250	3.000	8.69		3000	3000	3000	3000	3000	3000	3000	3000	3600	4320	4730	5350	5740	6170	6690	7200	
	*3.500	0.281	2.938	9.67		3000	3000	3000	3000	3000	3000	3000	3000	4050	4860	5320	6010	6470	6940	7510	8090	
	*3.500	0.300	2.900	10.26	XS / 80	3000	3000	3000	3000	3000	3000	3000	3000	4320	5180	5680	6420	6910	7410	8020	8640	
	*3.500	0.438	2.624	14.34	160	3000	3000	3000	3000	3000	3000	3000	3000	6310	7570	8290	9370	10090	10810	11710	12610	
	3 1/2	4.000	0.109	3.782	4.53		1720	2060	2260	2550	2750	2940	3190	3430	1370	1650	1810	2040	2200	2350	2550	2750
		4.000	0.150	3.700	6.17		2360	2840	3110	3510	3780	4050	4390	4730	1890	2270	2480	2810	3020	3240	3510	3780
4.000		0.156	3.688	6.41		2460	2950	3230	3650	3930	4210	4560	4910	1970	2360	2580	2920	3140	3370	3650	3930	
4.000		0.188	3.624	7.66		2960	3550	3890	4400	4740	5080	5500	5920	2370	2840	3110	3520	3790	4060	4400	4740	
*4.000		0.226	3.548	9.12	Std / 40	3560	4270	4680	5290	5700	6100	6610	7120	2850	3420	3740	4230	4560	4880	5290	5700	
*4.000		0.250	3.500	10.02		3940	4730	5180	5850	6300	6750	7310	7880	3150	3780	4140	4680	5040	5400	5850	6300	
*4.000		0.281	3.438	11.17		4430	5310	5820	6580	7080	7590	8220	8850	3540	4250	4650	5260	5660	6070	6580	7080	
*4.000		0.318	3.364	12.52	XS / 80	5010	6010	6580	7440	8010	8590	9300	10000	4010	4810	5270	5950	6410	6870	7440	8010	
*4.000		0.438	3.124	16.68	160	6900	8280	9070	10000	10000	10000	10000	10000	5520	6620	7250	8200	8830	9460	10250	11040	
4		4.500	0.109	4.282	5.12		1530	1830	2010	2270	2440	2620	2830	3050	1220	1460	1600	1810	1950	2090	2270	2440
		4.500	0.125	4.250	5.85		1750	2100	2300	2660	2800	3000	3250	3500	1400	1680	1840	2080	2240	2400	2600	2800
		4.500	0.141	4.218	6.57		1970	2370	2590	2930	3160	3380	3670	3950	1580	1900	2080	2350	2530	2710	2930	3160
	4.500	0.156	4.188	7.24		2180	2620	2870	3240	3490	3740	4060	4370	1750	2100	2300	2600	2800	3000	3240	3490	
	4.500	0.172	4.156	7.96		2410	2890	3160	3580	3850	4130	4470	4820	1930	2310	2530	2860	3080	3300	3580	3850	
	4.500	0.188	4.124	8.67		2630	3160	3460	3910	4210	4510	4890	5260	2110	2530	2770	3130	3370	3610	3910	4210	
	4.500	0.203	4.094	9.32		2840	3410	3740	4220	4550	4870	5280	5680	2270	2730	2990	3380	3640	3900	4220	4550	
	4.500	0.219	4.062	10.02		3070	3680	4030	4560	4910	5260	5690	6130	2450	2940	3220	3640	3920	4200	4560	4910	
	*4.500	0.237	4.026	10.80	Std / 40	3320	3980	4360	4930	5310	5690	6160	6640	2650	3190	3490	3940	4250	4550	4930	5310	
	*4.500	0.250	4.000	11.36		3500	4200	4600	5200	5600	6000	6500	7000	2800	3360	3680	4160	4480	4800	5200	5600	
	*4.500	0.281	3.938	12.67		3930	4720	5170	5840	6290	6740	7310	7870	3150	3780	4140	4680	5040	5400	5840	6290	
	*4.500	0.312	3.876	13.97		4370	5240	5740	6490	6990	7490	8110	8740	3490	4190	4590	5190	5590	5990	6490	6990	
	*4.500	0.337	3.826	15.00	XS / 80	4720	5660	6200	7010	7550	8090	8760	9440	3770	4530	4960	5610	6040	6470	7010	7550	
	*4.500	0.438	3.624	19.02	120	6130	7360	8060	9110	9810	10000	10000	10000	4910	5890	6450	7290	7850	8410	9110	9810	
	*4.500	0.531	3.438	22.53	160	7430	8920	9770	10000	10000	10000	10000	10000	5950	7140	7820	8840	9520	10200	11040	11890	
	*4.500	0.674	3.152	27.57	XCS	9440	10000	10000	10000	10000	10000	10000	10000	7550	9060	9920	11220	12080	12940	14020	15100	
	*4.500	0.750	3.000	30.07	10000	10000	10000	10000	10000	10000	10000	10000	10000	8400	10080	11040	12480	13440	14400	15600	16800	
	5	5.563	0.125	5.313	7.27		1420	1700	1860	2100	2260	2430	2630	2830	1130	1360	1490	1680	1810	1940	2100	2260
5.563		0.156	5.251	9.02		1770	2120	2320	2620	2830	3030	3280	3530	1410	1700	1860	2100	2260	2420	2620	2830	
5.563		0.188	5.187	10.80		2130	2550	2800	3160	3410	3650	3950	4260	1700	2040	2240	2530	2730	2920	3160	3410	
5.563		0.219	5.125	12.51		2480	2980	3260	3680	3970	4250	4610	4960	1980	2380	2610	2950	3170	3400	3680	3970	
*5.563		0.258	5.047	14.63	Std / 40	2920	3510	3840	4340	4670	5010	5430	5840	2340	2800	3070	3470	3740	4010	4340	4670	
*5.563		0.281	5.001	15.87		3180	3820	4180	4730	5090	5460	5910	6360	2550	3050	3350	3780	4070	4360	4730	5090	
*5.563		0.312	4.93																			

DIMENSIONS, TEST PRESSURES AND DESIGN PRESSURES

Nominal Size	O.D. in.	Wall in.	L.D. in.	Weight lbs/ft	Class/Schedule	MHI Test Pressure, psi							Design Pressures, Oil and Gas - Class 1 Locations, psi								
						Gr B	X42	X46	X52	X56	X60	X65	X70	Gr B	X42	X46	X52	X56	X60	X65	X70
8	8.625	0.156	8.313	14.12		1140	1370	1500	1690	1820	1950	2120	2280	910	1090	1200	1350	1460	1560	1690	1820
	8.625	0.188	8.249	16.96		1370	1650	1800	2040	2200	2350	2550	2750	1100	1320	1440	1630	1760	1880	2040	2200
	8.625	0.203	8.219	18.28		1480	1780	1950	2200	2370	2540	2750	2970	1190	1420	1560	1760	1900	2030	2200	2370
	8.625	0.219	8.187	19.68		1600	1920	2100	2380	2560	2740	2970	3200	1280	1540	1680	1900	2050	2190	2380	2560
	*8.625	0.250	8.125	22.38	20	1830	2190	2400	2710	2920	3130	3390	3650	1460	1750	1920	2170	2340	2500	2710	2920
	*8.625	0.277	8.071	24.72	30	2020	2430	2660	3010	3240	3470	3760	4050	1620	1940	2130	2400	2590	2770	3010	3240
	*8.625	0.312	8.001	27.73	Std / 40	2280	2730	3000	3390	3650	3910	4230	4560	1820	2190	2400	2710	2920	3130	3390	3650
	*8.625	0.322	7.981	28.58		2350	2820	3090	3490	3760	4030	4370	4700	1880	2260	2470	2800	3010	3230	3490	3760
	*8.625	0.344	7.937	30.45		2510	3020	3300	3730	4020	4310	4670	5030	2010	2410	2640	2990	3220	3450	3730	4020
	*8.625	0.375	7.875	33.07		2740	3290	3600	4070	4380	4700	5090	5480	2190	2630	2880	3260	3510	3760	4070	4380
	*8.625	0.406	7.813	35.67	XS / 80	2970	3560	3900	4410	4740	5080	5510	5930	2370	2850	3120	3520	3800	4070	4410	4740
	*8.625	0.438	7.749	38.33		3200	3840	4200	4750	5120	5480	5940	6400	2560	3070	3360	3800	4100	4390	4750	5120
	*8.625	0.500	7.625	43.43		3650	4380	4800	5430	5840	6260	6780	7300	2920	3510	3840	4340	4670	5010	5430	5840
	*8.625	0.562	7.501	48.44		4110	4930	5400	6100	6570	7040	7620	8210	3280	3940	4320	4880	5250	5630	6100	6570
	*8.625	0.594	7.437	51.00	100	4340	5210	5700	6450	6940	7440	8060	8680	3470	4170	4560	5160	5550	5950	6400	6940
	*8.625	0.625	7.375	53.45		4570	5480	6000	6780	7300	7830	8480	9130	3650	4380	4800	5430	5840	6260	6780	7300
10	10.750	0.156	10.438	17.67		910	1100	1200	1360	1460	1570	1700	1830	730	880	960	1090	1170	1250	1360	1460
	*10.750	0.188	10.374	21.23		1100	1320	1450	1640	1760	1890	2050	2200	880	1060	1160	1310	1410	1510	1640	1760
	*10.750	0.203	10.344	22.89		1190	1430	1560	1770	1900	2040	2210	2380	950	1140	1250	1410	1520	1630	1770	1900
	*10.750	0.219	10.312	24.65		1280	1540	1690	1910	2050	2200	2380	2570	1030	1230	1350	1530	1640	1760	1910	2050
	*10.750	0.250	10.250	28.06	20	1470	1760	1930	2180	2340	2510	2720	2930	1170	1410	1540	1740	1880	2010	2180	2340
	*10.750	0.279	10.192	31.23	Std / 40	1640	1960	2150	2430	2620	2800	3040	3270	1310	1570	1720	1940	2090	2240	2430	2620
	*10.750	0.307	10.136	34.27		30	1800	2160	2360	2670	2880	3080	3340	3600	1440	1730	1890	2140	2300	2470	2670
	*10.750	0.312	10.126	34.81		1830	2190	2400	2720	2930	3130	3400	3660	1460	1760	1920	2170	2340	2510	2720	2930
	*10.750	0.344	10.062	38.27		2020	2420	2650	3000	3230	3460	3740	4030	1610	1940	2120	2400	2580	2760	3000	3230
	*10.750	0.365	10.020	40.52	XS 60	2140	2570	2810	3180	3420	3670	3970	4280	1710	2050	2250	2540	2740	2930	3180	3420
	*10.750	0.400	9.950	44.26		2340	2810	3080	3480	3750	4020	4350	4690	1880	2250	2460	2790	3000	3210	3480	3750
	*10.750	0.438	9.874	48.28		2570	3080	3370	3810	4110	4400	4770	5130	2050	2460	2700	3050	3290	3520	3810	4110
	*10.750	0.500	9.750	54.79		2930	3520	3850	4350	4690	5020	5440	5860	2340	2810	3080	3480	3750	4020	4350	4690
	*10.750	0.562	9.626	61.21	100	3290	3950	4330	4890	5270	5650	6120	6590	2630	3160	3460	3910	4220	4520	4890	5270
	*10.750	0.594	9.562	64.49		3480	4180	4580	5170	5570	5970	6460	6960	2780	3340	3660	4140	4460	4770	5170	5570
	*10.750	0.625	9.500	67.65	3660	4400	4810	5440	5860	6280	6800	7330	2930	3520	3850	4350	4690	5020	5440	5860	
12	12.750	0.172	12.406	23.13		850	1020	1120	1260	1360	1460	1580	1700	680	820	890	1010	1090	1170	1260	1360
	12.750	0.188	12.374	25.25		930	1110	1220	1380	1490	1590	1730	1860	740	890	960	1100	1190	1270	1380	1490
	*12.750	0.203	12.344	27.23		1000	1200	1320	1490	1600	1720	1860	2010	800	960	1050	1190	1280	1380	1490	1600
	*12.750	0.219	12.312	29.34		1080	1300	1420	1610	1730	1860	2010	2160	870	1040	1140	1290	1390	1480	1610	1730
	*12.750	0.250	12.250	33.41	20	1240	1480	1620	1840	1980	2120	2290	2470	990	1190	1300	1470	1580	1690	1840	1980
	*12.750	0.281	12.188	37.46	Std / 40	1390	1670	1820	2060	2220	2380	2580	2780	1110	1330	1460	1650	1790	1900	2060	2220
	*12.750	0.312	12.126	41.48		30	1540	1850	2030	2290	2470	2640	2860	3080	1230	1480	1620	1830	1970	2110	2290
	*12.750	0.330	12.090	43.81		1630	1960	2140	2420	2610	2800	3030	3260	1300	1570	1710	1940	2090	2240	2420	2610
	*12.750	0.344	12.062	45.62		1700	2040	2230	2530	2720	2910	3160	3400	1360	1630	1790	2020	2180	2330	2530	2720
	*12.750	0.375	12.000	49.61	XS 60	1850	2220	2440	2750	2960	3180	3440	3710	1480	1780	1950	2200	2370	2540	2750	2960
	*12.750	0.406	11.938	53.57		40	2010	2410	2640	2980	3210	3440	3730	4010	1600	1930	2110	2380	2570	2790	2980
	*12.750	0.438	11.874	57.65		2160	2600	2840	3220	3460	3710	4020	4330	1730	2080	2280	2570	2770	2970	3220	3460
	*12.750	0.500	11.750	65.48		2470	2960	3250	3670	3950	4240	4590	4940	1980	2370	2600	2940	3160	3390	3670	3950
	*12.750	0.562	11.626	73.22	100	2780	3330	3650	4130	4440	4760	5160	5550	2220	2670	2920	3300	3550	3810	4130	4440
	*12.750	0.594	11.562	77.19		2940	3520	3860	4360	4700	5030	5450	5870	2350	2820	3090	3490	3760	4030	4360	4700
	*12.750	0.625	11.500	81.01	3090	3710	4060	4590	4940	5290	5740	6180	2470	2960	3250	3670	3950	4240	4590	4940	
12.750	0.688	11.374	88.71	3400	4080	4470	5050	5440	5830	6310	6800	2720	3260	3570	4040	4350	4660	5050	5440		
14	14.000	0.188	13.624	27.76		850	1020	1110	1260	1350	1450	1570	1690	680	810	890	1010	1080	1160	1260	1350
	14.000	0.203	13.594	29.94		910	1100	1200	1360	1460	1570	1700	1830	730	880	960	1090	1170	1250	1360	1460
	*14.000	0.219	13.560	32.26		990	1180	1300	1460	1580	1690	1830	1970	790	950	1040	1170	1260	1350	1460	1580
	*14.000	0.250	13.500	36.75		1130	1350	1480	1670	1800	1930	2090	2250	900	1080	1180	1340	1440	1540	1670	1800
	*14.000	0.281	13.438	41.21	20	1260	1520	1660	1880	2020	2170	2350	2530	1010	1210	1330	1500	1620	1730	1880	2020
	*14.000	0.312	13.376	45.65	Std / 30	1400	1680	1850	2090	2250	2410	2610	2810	1120	1350	1480	1670	1800	1930	2090	2250
	*14.000	0.344	13.312	50.22		30	1550	1860	2030												

DAVID HOWELL The author recognized a need for a report or “how to” manual for properly appraising pipelines and pipeline right of ways. Currently the work is being done by accounting firms, engineers, and even real estate appraisers.

Howell has some forty-five years experience in many sectors of the petroleum industry from drilling contractor and oil and gas operator to pipe and supply distribution throughout the world. He has published Tradex Equipment magazine, the Whole World Oil Directory, and the Texas Oil Register.

For the past twenty years, Howell has been almost exclusively engaged in pipeline sales and acquisition, appraisal, removal for salvage and, environmental remediation and general pipeline operations.

This handbook draws from these forty-five years of experience.

Howell is a graduate of Texas A&M University - Kingsville and a native of Alice, Texas. He is currently residing in Houston and is the managing partner of Pipeline Equities.

