COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

Electronic Investigation of the Proposed Pole Attachment Tariffs of Investor Owned Electric Utilities	)))))	Case No. 2022-00105

REBUTTAL TESTIMONY

OF

CHRISTOPHER F. TIERNEY

Submitted on Behalf of

Kentucky Power Company and Duke Energy Kentucky, Inc.

Q: PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND OCCUPATION.

A: My name is Christopher F. Tierney. I am a Partner at HKA Global, an international consulting firm of accounting, financial, economic, and engineering professionals with significant experience and expertise with the public utility industry, government contracting, construction, intellectual property, and other matters. My office address is 1919 M Street NW, Suite 620, Washington, DC 20036.

Q: ON WHOSE BEHALF IS THIS REBUTTAL TESTIMONY BEING PRESENTED?

A: This testimony is offered on behalf of Kentucky Power Company ("Kentucky Power") and Duke Energy Kentucky, Inc. ("Duke Energy Kentucky").

Q: HAVE YOU EVER TESTIFIED BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION BEFORE?

A: No.

Q: WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?

A: The purpose of my testimony is to rebut certain aspects of the testimony submitted by Ms. Patricia Kravtin on behalf of the Kentucky Broadband Cable Association ("KBCA"). Ms. Kravtin claims that utility pole owners receive substantial benefits from make-ready pole replacements and should therefore cover the majority of their associated costs. More specifically, Ms. Kravtin argues that the appropriate amount that attachers should pay for make-ready pole replacements is the remaining net book value of the utility's original pole. My analysis shows that utilities and their electric customers incur minimal (at best) benefits from make-ready pole replacements and would be in a significant net loss position under Ms. Kravtin's proposal.

Q: PLEASE SUMMARIZE YOUR EDUCATION AND PROFESSIONAL BACKGROUND.

A: I attended Georgia Institute of Technology where I graduated with a bachelor's degree of Civil Engineering with Honors. I then attended the Freeman School of Business at Tulane University and received my MBA with concentrations in Accounting and Finance.

My professional background includes a wide range of business and litigation consulting services for electric utilities as well as in other industries over the last 35 years. Previously, I was a Project Engineer at a major oil and gas company.

I came to HKA Global through an acquisition of The Kenrich Group in 2019, where I was a founding partner, Vice President and CFO and Board Member for 14 years. Similar to HKA Global, Kenrich provided business and litigation consulting services to companies and government agencies in a wide variety of industries. During most of my career, including prior to Kenrich, I have worked nearly continuously and directly with regulated utilities throughout the United States.

During my career, I have provided expert testimony and authored or co-authored reports in U.S. Federal Court and international arbitration. Several matters on which I have led consulting teams or otherwise assisted clients have involved disputes or prudence issues valued in the billions of dollars. During my career, I have also provided training on accounting, finance, schedule analysis, and economic damages issues to clients, law firms and industry groups.

Q: WHAT IS YOUR EXPERIENCE RELEVANT TO THIS MATTER CONCERNING POLE ATTACHMENTS?

A: Since I began my consulting career in the mid-1980s, I have nearly continuously assisted electric utility clients with commercial disputes, regulatory reviews and investigations or other business challenges. My initial involvement with pole attachment matters came in 2018, when Kenrich was retained by outside counsel representing multiple electric utilities to assist with evaluating costs and benefits related to various Joint Use Agreements and pole attachment agreements. More recently, I co-authored a report with two of my HKA

colleagues in connection with a Federal Communications Commission ("FCC") proceeding concerning make-ready pole replacement cost allocation issues similar to the issues raised by Ms. Kravtin in this proceeding.[1]

Q: WHAT IS A MAKE-READY POLE REPLACEMENT?

A: A make-ready pole replacement occurs when an attaching entity's request to attach to a utility's pole necessitates the replacement of that pole sooner than would have otherwise occurred (i.e., had that pole been allowed to remain in place through the end of its actual useful life), typically with a taller and/or stronger pole, as required to accommodate the attacher entity's equipment.

Q: AS POLE OWNERS, DO KENTUCKY POWER AND DUKE ENERGY KENTUCKY RECEIVE A MEANINGFUL ECONOMIC BENEFIT FROM MAKE-READY POLE REPLACEMENTS?

A: Certainly not a concrete economic benefit. Though the utility may potentially realize a time value of money benefit from a make-ready pole replacement when the life of the replacement pole exceeds the remaining life of the existing pole, this would be true only when: (a) the replacement pole is of the height/class needed to accommodate the electric utility's then-unknown future needs at the time the pole would otherwise have been replaced, and (b) the existing poles would ultimately have required replacement at some future point (rather than becoming technologically obsolete).

Q: ASSUMING FOR THE SAKE OF ARGUMENT THAT A MAKE-READY POLE REPLACEMENT WOULD ACTUALLY MEET THE UTILITY'S THEN-UNKNOWN SERVICE NEEDS AT THE TIME THE ORIGINAL POLE WOULD OTHERWISE HAVE BEEN REPLACED, CAN THAT BENEFIT BE QUANTIFIED?

[1] See Appendix 1 for my resume.

A: Yes, the benefit can be quantified based on the utility's average pole replacement cost, average number of years by which pole replacements in the normal course are deferred by make-ready pole replacements, and the utility's weighted average cost of capital. The table below summarizes average pole replacement costs, average number of years by which replacement is delayed and the associated benefit of deferred pole replacement for Kentucky Power and Duke Energy Kentucky.

Table 1

Summary of Economic Benefit of Delayed Pole Replacements[2]

Utility	Average Current Pole Replacement Cost (2022 $)	Deferral Period (Years)	Present Value Benefit To Utility Of Deferred Pole Replacement (2022 $)
Duke Energy Kentucky	$ 11,394	38.0	$ 5,107
Kentucky Power	9,159	25.9	2,325

Note: The "deferral period" represents the average number of years by which the normal replacement of an average utility pole is delayed due to a premature make-ready pole replacement.

Q: ASSUMING A BENEFIT FROM MAKE-READY POLE REPLACEMENTS, AS QUANTIFIED IN THE ABOVE TABLE, HOW DOES THAT IMPACT A UTILITY'S DECISION TO PREMATURELY REPLACE POLES TO ACCOMMODATE ATTACHING ENTITIES?

A: As depicted in the above table, the benefit of the deferred capital expenditure is significantly less than today's cost of replacing a pole. Even with this alleged benefit, electric utilities would incur a substantially greater upfront cost to replace a pole and be in a net loss

[2] This analysis assumes that benefits, as alleged by Ms. Kravtin, exist for utilities when a pole is replaced in the make-ready process to accommodate a third-party attachment request. HKA disagrees with this conclusion as there are additional risks a utility would incur when paying the entire upfront costs for make-ready pole replacements, particularly given that the assumed *future* pole replacement may never be required by the utility. See also Exhibit 1.

position for each pole replaced. It is important to recognize that it is speculative to assume existing poles will ever need to be replaced given the pace of technological change, as well as storm hardening[3] and other undergrounding efforts. It is also speculative to assume that if a replacement is needed in the future, that the make-ready replacement pole would meet the utility's (i.e., its customers) future needs. A reasonable utility would make the capital expense decision of what type of pole (height, class, composition), if any, is required at the time of the future replacement when the utility could better assess its needs. The utility no longer has that option when a make-ready replacement is made sooner, in order to accommodate a third-party attachment request.

Q: WHAT DO YOU UNDERSTAND MS. KRAVTIN'S PROPOSAL TO BE WITH RESPECT TO COMPENSATING UTILITIES FOR MAKE-READY POLE REPLACEMENTS?

A: I understand that Ms. Kravtin is proposing that, for make-ready pole replacements, attachers reimburse a utility an amount equal to the remaining average net book value of the utility's poles, based on the premise that she believes this amount represents the "unused value" of the existing pole at the time of replacement.

Q: WOULD A UTILITY BE MADE WHOLE FOR A "PREMATURE" POLE REPLACEMENT IF THE NEW ATTACHER WERE TO PAY THE REMAINING NET BOOK VALUE OF THE POLE BEING REPLACED?

A: No, and there are at least three fundamental problems with Ms. Kravtin's proposal.

First, utilities do not capitalize (i.e., record to a balance sheet asset account) all costs incurred in replacing poles. Utilities generally charge costs associated with materials and certain removal/installation labor to FERC Account 364 ("Poles, towers and fixtures"). However, there are other significant one-time costs associated with pole replacements which may be expensed (e.g., transfer of equipment from the old pole to the new pole).

[3] Storm hardening generally involves physically changing infrastructure to make it less susceptible to damage from extreme weather events.

Additionally, other one-time costs may be capitalized but are not recorded to FERC Account 364 (e.g., grounds charged to FERC Account 365 and lightning arresters charged to FERC Account 368).[4] For Kentucky Power and Duke Energy Kentucky, these one-time pole replacement costs that are not captured in FERC Account 364 can together represent over 35% of the total costs to replace an average pole and are not captured by any calculation of remaining net book value of existing poles.[5] The remaining net book value therefore does not capture all the (then as yet undepreciated) one-time (i.e., non-recurring) costs that are incurred by utilities to replace poles.

Second, consistent with Generally Accepted Accounting Principles (GAAP), the capitalized pole replacement costs that reside on the balance sheet are based on historical costs (rather than current costs). Because poles are long-lived assets, much of the cost captured on the utility's balance sheet for poles in service reflects purchase prices from decades ago. Those prices are significantly lower than the prices applicable to pole replacements today (and thus generally making the remaining net book value a woefully insufficient amount for payment by a new attacher).[6] By, in essence, focusing on historical costs, in a "backward looking" analysis, Ms. Kravtin appears to have entirely overlooked the current economic cost of premature pole replacements on electric utilities and their customers.

Third, the remaining net book value of the average pole is based on the *accounting* depreciation life of a pole. The actual useful life of utility poles is typically longer than the depreciation life that utilities typically assume for accounting purposes. Therefore, as poles remain in service and age, their net book value (i.e., net of accounting depreciation)

[4] I understand utilities will frequently replace grounds and arrestors for a make-ready pole replacement to maintain system reliability and function.

[5] Duke Energy Kentucky allocates approximately 68% of one-time pole replacement costs to FERC balance sheet accounts other than FERC 364 and expenses approximately 15% to FERC income statement accounts. American Electric Power, Kentucky Power's current parent company, allocates approximately 37% and 11% of one-time pole replacement costs to FERC balance sheet accounts other than FERC 364 and FERC income statement accounts, respectively.

[6] Since January 2020, the Producer Price Index for: "Lumber and Wood Products: Wood Poles, Piles, and Posts Owned and Treated by the Same Establishment" has increased by more than 25%.

increasingly undervalues existing poles. Utility poles often remain in service long after they have been fully depreciated (i.e., their remaining book value is zero).

Q: DID YOU DETERMINE HOW THE TOTAL COST OF A MAKE-READY POLE REPLACEMENT WOULD BE ALLOCATED BETWEEN THE UTILITY AND AN ATTACHER UNDER MS. KRAVTIN'S PROPOSAL?

A: Yes. For Kentucky Power and Duke Energy Kentucky, the attacher would pay only approximately 5 percent of the total cost of an average make-ready pole replacement. The table below summarizes for each utility the average current cost of a pole replacement and remaining book value for the average pole.

Table 2

Summary of Average Pole Replacement Costs and Current Remaining Book Value of Existing Poles in Service[7]

	[A]	[B]	[C = B / A]	[D = A - B]	[E = D / A]
Utility	Average Current Pole Replacement Cost (2022 $)	Average Net Bare Pole Cost (2022 $)	Remaining Book Value As A % Of Pole Replacment Costs	Average Current Pole Replacement Cost Net Of Remaining Book Value (2022 $)	Percent of Make-Ready Pole Replacement To Be Paid By Utility Under Kravtin Proposal
Duke Energy Kentucky	$ 11,394	$ 557	4.9%	$ 10,837	95.1%
Kentucky Power	9,159	490	5.3%	8,669	94.7%

Q: HAVE YOU QUANTIFIED THE ECONOMIC IMPACT TO KENTUCKY POWER AND DUKE ENERGY KENTUCKY ASSUMING THAT THEY WERE COMPENSATED FOR MAKE-READY POLE REPLACEMENTS BASED ON MS. KRAVTIN'S PROPOSAL?

A: Yes. For the reasons stated above, any reliance on the remaining book value of poles to compensate a utility for premature pole replacements would be deeply flawed and grossly undercompensate utilities. As a further illustration, under Ms. Kravtin's proposed approach,

[7] Also see Exhibits 1 and 2.

wherein utilities would pay for the total cost of a pole replacement, adjusted only for the remaining net book value of the existing pole, the utilities would be incurring significant losses with each make-ready pole replacement. The table below summarizes the net make-ready pole replacement costs and the time value of money benefit resulting from the deferral of an otherwise necessary average pole replacement at the end of its useful life. Again, this illustration assumes (1) that the existing pole would otherwise need to be replaced eventually and (2) that the replacement pole will accommodate the utilities' electric service needs in the future.

Table 3

Illustration of Potential Impact to Utilities of Ms. Kravtin's Proposed Cost Allocation[8]

	[A]	[B]	[C = B - A]
Utility	Average Current Pole Replacement Cost Net Of Remaining Book Value (2022 $)	Present Value Benefit To Utility Of Deferred Pole Replacement (2022 $)	Net Loss To Utility (2022)
Duke Energy Kentucky	$ 10,837	$ 5,107	$ (5,730)
Kentucky Power	8,669	2,325	(6,344)

Q: ARE THERE OTHER REASONS WHY NET BOOK VALUE IS INSUFFICIENT REIMBURSEMENT FOR MAKE-READY POLE REPLACEMENTS?

A: Yes, as referenced above, the focus on remaining book value as representative of the actual unused value of poles is backward looking and thus flawed. For example, when making investment decisions (whether in utility poles or any other asset having a business purpose), sunk costs are irrelevant. All that matters are the expected future costs and resulting benefits.

[8] Also see Exhibit 1 and Table 2.

While such a backward-looking approach may have a simplistic appeal and appear to correspond to cost and return regulated businesses, it fails to properly evaluate investment decisions at a macro level. For example, Ms. Kravtin's approach appears to completely ignore the financial impact of a utility's investment decisions on its customers. If a utility is required to bear make-ready pole replacement costs, it would be incurring costs that may have immaterial (if any) benefit to its electric customers and potentially a significant detriment.

Q: ARE UTILITIES SHIFTING THE COST TO MAINTAIN THEIR POLE INFRASTRUCTURE BY WAITING FOR ATTACHING ENTITIES TO INITIATE POLE REPLACEMENTS AS ALLEGED BY MS. KRAVTIN?

A: No. Based on my extensive experience working with electric utilities, these allegations are untrue. Further, and perhaps more importantly, this allegation is contrary to an electric utility's economic interests. As regulated businesses, utilities are allowed to earn a return (profit) on prudently invested capital. Thus, when a utility determines that a pole replacement is prudent and reasonable to ensure continued safe and reliable service, it knows it will recover a reasonable return on its investment and that there will be no detriment to shareholders. Not only is a utility economically incentivized to install poles at its own cost when it is prudent to do so, it is disincentivized to wait for a third-party to do so when it makes sense (i.e., lost opportunity to earn a return on the invested capital).

Q: DO UTILITY POLE OWNERS RECEIVE ADDITIONAL BENEFITS FROM MAKE-READY POLE REPLACEMENTS BEYOND THE POTENTIAL TIME VALUE OF MONEY BENEFIT CALCULATED ABOVE?

A: No. Ms. Kravtin argues that, in addition to the time value of money benefit of delaying pole replacements costs discussed earlier in this report (i.e., when an attacher pays to replace a used pole with a new pole), three other alleged benefits of an early pole replacement accrue to the utility:

- New poles require less maintenance.
- New poles provide the opportunity for new attachers (and associated rental income) because of additional space on the new pole.[9]
- In the same way that attacher-caused new poles may include available space for potential future attachers, that space is alternately available to the utility should it desire to use it for its own purposes (e.g., to somehow enhance its own services or provide a new service).

The arguments on which these alleged benefits are based, are economically irrational and/or wholly unsupported. Ms. Kravtin makes no attempt to quantify any of the alleged benefits, nor are any concrete examples provided. Speculation is not a reasonable basis for a fundamental reallocation of make-ready pole replacement costs.

Q: DO YOU BELIEVE MS. KRAVTIN'S PROPOSAL TO SHIFT POLE REPLACEMENT COST TO UTILITIES WOULD MAKE THE PRESENT SITUATION WORSE?

A: Yes. Utilities (and their customers) are currently incentivized to build only as much pole capacity as is currently needed. In other words, utilities are not currently incentivized to build "excess capacity" to accommodate potential future broadband needs. Consequently, the same pole could require multiple replacements as successive new attachers require additional capacity. The proposed change would not reduce these "inefficient" costs but simply shift them from the new attacher to the utility (and any pre-existing attachers), while the decision to initiate a request for pole replacement remains with the attacher.

In fact, if new attachers were allowed to make broadband deployment decisions with little regard for their actual costs (net of any identified benefits), the build-out of pole infrastructure would be economically less efficient. For example, if an attacher can deploy on poles for 10% of the actual cost (with the utility subsidizing the balance) it would

[9] I understand that when replacing poles, the minimum size increment is an additional five feet in length and attachers often only require one foot of space. Further, an additional five feet in length does not translate into an additional five feet of height and usable space as the larger replacement pole typically must be buried deeper into the ground for stability purposes.

reasonably do so every time if that 10% charge was less than the alternative. This would be true even if the alternative were significantly less expensive than the combined total cost (utility and attacher) of deploying on poles (which is more likely to be the case if the existing poles are insufficient to accommodate the attacher and therefore need to be replaced).

Similarly, if utilities (and therefore, their customers) are forced to bear costs for which they do not receive commensurate financial benefit, they will naturally be more economically inclined to simply deny pole access to new attachers where allowed to do so.

Q: DO YOU HAVE ANY FURTHER OBSERVATIONS FROM YOUR REVIEW OF MS. KRAVTIN'S PROPOSAL?

A: Yes. Ms. Kravtin states that "[t]he lion's share of [the] betterment value inherent in the replacement pole accrues to the utility, not the attacher."[10] It is noteworthy that Ms. Kravtin makes no reference to (let alone an attempt to quantify and contrast) the benefits received by the attaching entity's shareholders or its customers as a result of gaining access to the utilities' pole infrastructure. In other words, the justification for her make-ready pole replacement cost allocation proposal is premised upon the alleged economic benefit to pole owners, but there is no mention or analysis of the economic benefit to attaching entities through access to pole networks. In any case, I understand the focus of the Commission's investigation to be on utility tariffs and ensuring utilities are made whole for make-ready pole replacement costs, and not on which party benefits (or in what amount).

Q: DO YOU HAVE ANY CONCLUDING THOUGHTS?

A: To the extent this matter seeks to establish new tariffs for utilities aimed at better aligning incentives between pole owners and attachers to ultimately result in enhanced decision-making (related to pole infrastructure) which promotes quick and cost-effective broadband deployment, the changes proposed by Ms. Kravtin are off the mark. At best, they would simply shift certain pole infrastructure costs from attaching entities to utilities. These costs

[10] Kravtin Direct Testimony dated June 9, 2022, p. 8.

that Ms. Kravtin proposes shifting (from attacher to utility) would not need to be incurred but for the attacher, nor would those shifted costs provide any meaningful, non-speculative benefit to the utility. In addition, Ms. Kravtin's proposal, because of the economic disincentives imposed on the utilities, would almost certainly result in significantly increased denials of requests to expand capacity through make-ready pole replacements and would thus be counter-productive to the goal of faster, more cost-effective broadband deployment.

Q: DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?

A: Yes.

VERIFICATION

The undersigned, Christopher F. Tierney, being duly sworn, deposes and says he is a Partner for HKA Global that he has personal knowledge of the matters set forth in the forgoing testimony, and the information contained therein is true and correct to the best of his information, knowledge and belief after reasonable inquiry.

Christopher F. Tierney

Commonwealth of ~~Kentucky~~ VIRGINIA)
) Case No. 2022-00105
County of ~~Boyd~~ FAIRFAX)

Subscribed and sworn to before me, a Notary Public in and before said County and State, by Christopher F. Tierney, this 11TH day of July 2022.

Notary Public

Notary ID Number: _____

My Commission Expires: _____

JAMES HILSDON
Notary Public
Commonwealth of Virginia
Registration # 7590108
My Commission Expires April 30, 2022

2026

CURRICULUM VITAE

CHRISTOPHER F. TIERNEY

PARTNER

QUALIFICATIONS

MBA, Master of Business Administration, Concentrations in Accounting and Finance, A.B., Freeman School of Business, Tulane University
Bachelor of Civil Engineering with Honors, Georgia Institute of Technology

MEMBERSHIPS

National Society of Professional Engineers
Institute of Management Accountants
American Bar Association
International Bar Association

PROFILE

Chris Tierney is a Partner in the Washington, DC office of HKA. Previously, Chris was a Vice President and Chief Financial Officer, and a Member of the Board of Directors at The Kenrich Group LLC. (Kenrich was acquired by HKA in 2019.) Before entering the consulting field, Chris was a project engineer at Chevron, where he worked on the design and construction of oil and gas drilling and production facilities.

Chris has been consulting with Fortune 500 Companies, law firms and government entities and other organizations for more than 30 years. Chris' consulting work has focused on financial, accounting, economic and damages matters in numerous and diverse areas, including the electric power industry, major infrastructure and other construction projects, military procurement involving aircraft, munitions and other defense programs, financial services and manufacturing. He has analyzed accounting and economic issues in various types of disputes, including breach of contract, intellectual property, fraud investigations and bankruptcy. Economic damages assessed include increased costs, schedule delay, lost profits and lost business value. In addition, Chris has advised clients on alternative capital investments and other business matters.

In commercial construction, government contract and procurement matters, Chris has extensive experience investigating and quantifying the economic impacts of design defects, performance deficiencies, changed conditions, schedule delay and other issues arising on large capital projects, several of which have exceeded one billion dollars in value. He has consulted with both private and public project owners, contractors, architect/engineering firms and sureties.

Chris has provided trial and deposition testimony, presented in mediation, and has assisted counsel and clients in settlement negotiations.

EXPERIENCE

CLIENT AND INDUSTRY EXPERIENCE

Clients include electric and water utilities, commercial and government contractors, project owners and developers, architect and engineering firms, federal and state agencies, municipalities, banks and insurance companies.

Project and industry experience includes construction, electric power, oil and gas, aircraft, shipbuilding, telecommunications, aerospace, information technology, healthcare, real estate, and textiles manufacturers, among others.

REGULATED INDUSTRIES

Consulted on numerous electric utility matters involving nuclear, coal, natural gas, hydroelectric and cogeneration plants and distribution facilities. Work has included cost and schedule analysis in the context of construction disputes, as well as general management consulting including resource planning, multiyear supplier contract negotiations, customer rate proceedings and other regulatory matters.

Consulting with more than a dozen nuclear utilities on the economic and other impacts of the United States Department of Energy's delayed removal of spent nuclear fuel from commercial nuclear plants. Related claims are estimated in the tens of billions of dollars. Working with utility personnel and outside technical experts to identify necessary activities undertaken to store increasing volumes of spent nuclear fuel onsite for an extended period of several decades.

Assisted several nuclear utilities to identify and quantify impacts associated with defective steam generators. Related claims against Nuclear Steam Supply System (NSSS) suppliers exceeded several billion dollars and included costs for steam generator remediation activities and eventual replacement. Lost sales and increased costs resulting from replacing lost generation during related refueling outage extensions and early plant retirement were also analyzed.

Consulted with the primary lender in connection with a bankrupt utility cooperative regarding its ownership of a nuclear power plant. Developed pro forma financial information and determined potential values of the nuclear plant. Reviewed prospectus information, as well as historical generation and financial data, including fuel, non-fuel operating and maintenance costs and revenue projections based on existing power contracts supply contracts.

Studied management performance and operating practices at a nuclear utility over a multi-year period leading to an extended plant shutdown enforced by the Nuclear Regulatory Commission (NRC). Interviewed senior utility executives, reviewed board meeting minutes and formal reports by internal task forces and outside consultants to assess potential impact of "cost reductions" and other events on employee morale and corporate culture. Assisted the utility in segregating plant operating performance issues between NRC findings and the otherwise typical challenges faced by utility management.

Reviewed and analyzed nuclear plant decommissioning costs and studied alternative approaches to decommissioning to assess the economic, financial, schedule, political and other implications associated with each alternative approach. Authored two "Decommissioning Cost Estimates" for a multi-billion-dollar project to support utility testimony at the California Public Utility Commission.

Developed financial models to assist electric utilities with analyses of economic viability of large capital investments, including cost/benefit analysis of escalating equipment repair and maintenance costs versus early replacement, as well as resource planning options involving plant power uprates, early plant retirement and other strategic issues (e.g., review and selection of alternative vendors supplying equipment and services under contracts exceeding hundreds of millions of dollars).

Assisted a nuclear utility with responding to an industry-wide United States Nuclear Regulatory ("NRC") Commission 50.54(f) letter requiring demonstration that operating nuclear plants were safe, and that the as-built plant and operating practices conformed to plant design documentation, operating procedures and other NRC license requirements.

Consulted on "prudence" investigations and reviews related to nuclear and other power plant construction and operations, including the underlying causes of and amounts for cost growth and schedule delay, replacement power costs and proper methods for assessing and supporting the cost of individual impacting events and activities.

Worked with a nuclear utility to evaluate the cost-benefit of safety-related plant equipment upgrades. Analysis required detailed review of the Nuclear Regulatory Commission's methodology for evaluating averted on-site economic costs associated with Severe Accident Mitigation Alternatives and performing related calculations.

Performed critical path schedule analyses of refueling and unplanned plant outages to identify root cause of delays and the associated cost impacts, including worker productivity losses, extended time-related indirect costs, and lost sales and/or replacement power purchases.

Reviewed and consulted on business plans, operating and capital budgeting, and asset valuation studies. Assisted utilities in demonstration of compliance with state utility commission regulatory accounting and other requirements.

GOVERNMENT CONTRACTS

Assisted defense and other government contractors in the preparation of Requests for Equitable Adjustment, proposed change orders and claims on matters of all sizes, including some valued at more than $1 billion.

These government contract matters have involved domestic and international construction projects, national defense and other government agency equipment and software procurement programs, as well as services contracts. These matters entailed assessments of cost and schedule impacts associated with formal and constructive changes involving work scope, changed conditions, and delay and disruption of planned work.

Analyzed cost growth and schedule impacts on complex projects and programs to identify and demonstrate causal link between discrete events and circumstances and the resultant impacts. Evaluated and measured productivity impacts relating to quantity and nature of directed changes, allegations of mismanagement or management interference, and defective design or workmanship issues.

Analyzed schedule delay using Critical Path Method techniques. Identified and quantified schedule delay-related impacts on direct costs (labor productivity) as well as increased activity-related (certain field support activities) and time-related indirect costs (extended project/program management and support, unabsorbed or extended G&A costs in both construction and manufacturing environments).

Consulting on matters involving allegations of fraud, defective pricing, false claims, mischarges, improper labor charging and other improper billings to the government. Reviewed, analyzed and validated direct and indirect costs to determine and ensure compliance with applicable federal acquisition regulations and cost accounting standards with respect to costs being allowable and allocable, and properly stated.

Assisted clients in the preparation of contract termination claims and helped to defend against potential default terminations. Prepared claims for review by government auditors, including the Defense Contract Audit Agency (DCAA). Acquired familiarity with DCAA's Contract Audit Manual and the DCAA's audit programs used for the evaluation of various types of claims.

Claims experience on government contract matters involving aircraft modification, firearms, satellite and telecommunications equipment, computer systems, medical equipment and services.

CONSTRUCTION MATTERS

Performed analyses of financial statements and projections, contracts, auditing standards, policies and procedures and project cost accounting and schedule information for a variety of construction-related entities and projects. Consulted with contractors, architect/engineers, project owners, lenders and sureties.

Extensive experience in analyzing costs on various types of US and international projects, including power plants, airports, oil and gas facilities, manufacturing plants, telecommunications infrastructure, wastewater treatment facilities, dams, roads, bridges, commercial buildings and residential housing, among others.

Analyzed and prepared claims relating to formal and constructive changes and the impact of alleged schedule delay events and acceleration orders, defective design and specifications, workmanship quality issues, differing site conditions, and management interference.

Reviewed and prepared numerous delay and disruption claims involving labor productivity, schedule delay and acceleration and other issues. Performed Critical Path Method schedule analyses to determine causes and duration of schedule impacts and delays to completion. Investigated root causes of events and circumstances leading to schedule impacts to assist in the allocation and assignment of responsibility.

Reviewed and analyzed contract administration matters, including avoidance of disputes, appropriateness of contractual terms and conditions, and enhanced management procedures and controls. Consulted with design and construction firms in the development and implementation of procedures to contemporaneously identify and quantify cost and schedule impacts.

Responsible for project management on construction projects (as a design and construction engineer with Chevron), including oil and gas drilling and production facilities, and pipelines. Responsible for project oversight, negotiation of change orders, preparation of cost estimates and schedule projections, development of bid specifications, bid review and negotiations, and inspection of construction progress and workmanship.

SELECTED OTHER ECONOMIC DAMAGES, INTELLECTUAL PROPERTY, AND ACCOUNTING ANALYSES

Analyzed and prepared lost profits and business valuation damage claims. Analyses have included study of actual and projected revenues, cost of goods, indirect costs, general and administrative expenses, taxes, cost of capital, discount rates and various assets, liabilities and equity.

Performed market research and analysis for a variety of new and established products to assess probabilities and reasonableness of projected revenue streams. Markets studied include machinery parts, lighting equipment, power plant maintenance services, commercial retail space and residential property.

Investigated allegations of fraud at a large multinational corporation including misappropriation and theft of corporate assets by company executives, misstatement of financial reports filed with the Securities Exchange Commission, dissemination of other misleading investor information, mislabeling of product and other alleged improprieties.

Assisted a major electrical equipment manufacturer in defense of a breach of contract and trade secret claim related to motion picture lighting. Performed detailed analyses of the motion picture lighting market to project sales and rentals, direct and indirect costs, capital accessibility and requirements necessary for plaintiff to expand his business.

Performed analyses of go-forward economic viability impacted by delayed construction and increasing construction costs associated with a large multi-use building development (i.e., offices, hotel, shopping

mall). Studied real estate development plans and assessed estimated costs-to-complete, and projected operating/rental income and causes of deviations from original projections.

Assessed lost profit and property value damages suffered by real estate developer (luxury homes and commercial property) who discovered remnants of WWI-era chemical weapons on the property during excavation.

Developed cost allocation models including such factors as volume and toxicity for cleanup costs involving hundreds of potentially responsible parties.

Assisted and supervised an investigation to identify potentially responsible parties associated with a Massachusetts Superfund site. Conducted interviews with knowledgeable personnel and performed a detailed analyses of contemporaneous documentation to identify information related to content, toxicity, volume and source of waste product.

Performed project management services relating to timely and accurate cost and schedule estimating and reporting.

TESTIMONY AND ALTERNATIVE DISPUTE RESOLUTION EXPERIENCE

Authored expert report and gave deposition testimony related to economic damages in connection with an alleged defective electric distribution system in a new nuclear power plant. (United States District Court)

Co-authored an expert report and provided trial testimony regarding lost profits and business value caused by the breach of an operating agreement for a smoke and fire equipment company. (United States District Court)

Authored an expert report on damages incurred by an international contractor involving road design and construction. (UNCITRAL Arbitration)

Co-authored an expert report and gave deposition testimony related to damages resulting from the federal government's partial breach of a contract to dispose of commercial spent nuclear fuel. (United States Court of Federal Claims)

Authored an expert report and participated in mediation regarding electric power system upgrade at a Department of Veterans Affairs hospital. (United States Civilian Board of Contract Appeals)

Co-authored an expert report and gave deposition testimony in case involving the termination of a software license agreement. (Maryland State Court)

Co-authored an expert report regarding Canadian military aircraft modification program in an arbitration. (Private Arbitration)

Participated in an Alternative Dispute Resolution conference at United States Court of Federal Claims relating to business valuation issues involving alleged trade secret misappropriation.

LANGUAGES

English (native)

Kentucky Public Service Commission Electronic Investigation
HKA Analysis
Present Value Benefit To Utility Of Deferred Pole Replacement

Exhibit 1

	[A]	[B]	[C=A*(1+G)^(2022-B)]	[D]	[E]	[F=D-E]	[G]	[H]	[I=2022+F]	[J=C*(1+G)^F]	[K=J/(1+H)^F]	[L=2022+D]	[M=C*(1+G)^D]	[N= M/(1+H)^D]	[O=K-N]
									Current Replacement Scenario			Early Replacement Scenario			
	Average Pole Replacement Cost	Pole Replacement Cost Data Year/ Median Year	Average Current Pole Replacement Cost (Escalated To 2022 $)	Actual Useful Life Of A Pole (Years)	Average Current Age of Current Pole Network (Years)	Average Remaining Useful Life Of Current Pole Network (Years)	Average Annual Increase In Pole Replacement Costs[1]	WACC	Year Of Expected Pole Replacement	Make-Ready Pole Replacement Cost Escalated To Year Of Expected Replacement	PV Of Expected Future Pole Replacement Cost (2022 $)	Year Of Expected Pole Replacement	Make-Ready Pole Replacement Cost Escalated To Year Of Expected Replacement	PV Of Expected Future Pole Replacement Cost (2022 $)	Present Value Benefit To Utility Of Deferred Pole Replacement[2]
Duke Energy Kentucky	$ 10,868 [3]	2020	$ 11,394	52.0	38.0	14.0	2.39%	6.41%	2036	$ 15,859	$ 6,645	2074	$ 38,911	$ 1,538	$ 5,107
Kentucky Power	8,736	2020	9,159	50.0	25.9	24.1	2.39%	6.19%	2046	16,183	3,806	2072	29,835	1,481	2,325

General Note:
Knowledgeable personnel from Kentucky Power and Duke Energy Kentucky provided data that is used in this analysis.

Notes:
(1) The average annual increase in pole replacement costs is calculated based on Handy Whitman "Cost Trends of Electric Utility Construction" indices for the South Atlantic region using a 25-year average.
(2) This analysis assumes that benefits exist for utilities when a pole is replaced in the make-ready process to accommodate a third-party attachment request. HKA disagrees with this conclusion as there are additional risks a utility would incur when paying the entire upfront costs for make-ready pole replacements.
(3) Duke Energy's average pole replacement cost data does not include the cost for wire transfers.

Kentucky Public Service Commission Electronic Investigation
HKA Analysis
Average Net Bare Pole Costs

Exhibit 2

		[A]	[B]	[C]	[D=A-B-C]	[E]	[F=D*E]	[G]	[H=F/G]
	Data Date For Most Recent Rate Calculation	**Gross Pole Investment (FERC 364)**	**Accumulated Depreciation For Pole Investment**	**Accumulated Deferred Income Taxes**	**Net Pole Investment**	**Reduction For Non-Pole Appurtenances**	**Adjusted Net Pole Investment**	**Poles In Service**	**Average Net Bare Pole Cost**
Duke Energy Kentucky	2018	$ 63,697,773	$ 28,443,179	$ 8,653,993	$ 26,600,601	0.85	$ 22,610,511	40,591	$ 557
Kentucky Power	2020	247,409,282	74,002,405	48,227,068	125,179,809	0.85	106,402,838	217,172	490

General Note:

The purpose of this analysis is to calculate the average net bare pole cost assuming the FCC formula for net bare pole cost as a proxy for remaining net book value of in-place poles. Knowledgeable personnel from Kentucky Power and Duke Energy Kentucky provided data that is used in this analysis.