765kVFINAL_SUBMISSION_REBUTTAL_WBenJohnson_DOCKET_CN-25-117

Sasha Bergman, Executive Secretary
Minnesota Public Utilities Commission (MnPUC)
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

ATTENTION:
Chair Katie Sieben
Commissioner John Tuma
Commissioner Joseph Sullivan
Commissioner Hwikwon Ham
Commissioner Audrey Partridge

RE: FORMAL ADMINISTRATIVE INTERVENTION & DEMAND FOR PROOF OF ABSENCE OF RISK
DOCKET NO: E-002/TL-25-117
PROJECT: PowerOn Midwest 765 kV Transmission Line Project (Houston County Segment)

Dear Ms. Bergman and Honorable Commissioners,

Please find enclosed my formal "Setback Narrative and Statement of Requirement" regarding the proposed 765 kV HVAC transmission corridor. This submission serves as a formal demand for the adoption of health-protective setbacks based on contemporary, peer-reviewed science regarding mechanotransduction-mediated pathogenesis and active medical implant immunity thresholds.

I respectfully request that this document be entered into the permanent evidentiary record for Docket No. 25-117, and that a formal response be issued regarding the "Proof of Absence of Risk" required under the Commission's public safety and regulatory obligations.

Respectfully Submitted,

/s/ W. Ben Johnson, MD, FACC

W. Ben Johnson, MD, FACC
Former Institutional Review Board (IRB) Chair
Fellow of the American College of Cardiology

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

STATE OF MINNESOTA

In the Matter of the Route Permit Application for the PowerOn Midwest 765 kV HVAC Transmission Line Project Corridor Houston County, Minnesota Segment	))))	DOCKET NO. E-002/TL-25-117

Submitted by:
W. Ben Johnson, MD, FACC
Interested Person and Affected Landowner

Date of Filing: May 20, 2026

STATEMENT OF INTEREST AND PROPERTY IMPACT (NON-INTERVENOR)

I. Statement of Interest

I, William Ben Johnson, MD, FACC, submit these formal comments as an interested person and affected landowner regarding Docket No. 25-117 (PowerOn Midwest 765 kV Project). Although my primary clinical residence is in Iowa, I own real property in Houston County, Minnesota, heavily impacted by the proposed routing of this project. My interest in this proceeding is direct, personal, and tangible: the proposed 765 kV transmission path is routed through or immediately adjacent to my land, permanently affecting my constitutional rights to control, exclude, and determine the use of my property.

II. Description of Property Impact

The construction of massive lattice steel structures up to 200 feet in height and the clearing of a 250-foot-wide Right-of-Way represents an extreme, permanent physical intrusion onto productive agricultural land. This infrastructure will heavily impair ongoing farming operations, limit equipment mobility, degrade rural viewsheds, and cause immediate real estate market devaluation.

Crucially, this project imposes continuous, long-term environmental and biophysical stressors that a one-time eminent domain utility compensation payment cannot adequately reflect. My first-hand knowledge as an affected landowner is vital to assist the Commission in fulfilling its statutory mandate to

minimize adverse human and environmental impacts while evaluating regional grid integrity.

III. Specific Health and Safety Concerns

Beyond the physical impairment of agricultural land use, I am deeply concerned by the acute and chronic health risks associated with introducing this unprecedented voltage corridor into Houston County. My brief provides a precise clinical analysis of the 90.1 dB Acoustic-Kinetic Packet and outlines the mandatory 3.1-mile biological safety setback required to mitigate systemic inflammation, cellular priming, and neuro-cardiac stress.

As a physician, I argue that the Commission cannot fulfill its mandate of public convenience and necessity without evaluating this mechanotransduction modeling as a primary factor in its routing and technology determinations.

CLINICAL QUALIFICATIONS AND PROFESSIONAL EXPERTISE

I bring a unique dual perspective of advanced clinical cardiac science and rigorous human-subject protection to my analysis of the 765 kV project's biological hazards, backed by the following professional credentials:

1. Cardiovascular Electrophysiology Expertise: I am a retired physician with lifetime board certifications in Cardiology and Adult Cardiac Electrophysiology. Throughout my career, I specialized in the intrinsic electrical function of the human heart and the deployment of implantable devices. This provides me with the precise technical foundation required to analyze the bio-electrical and electromagnetic impacts of ultra-high-voltage transmission on human tissue and medical hardware.

2. **Institutional Review Board (IRB) Chairmanship:** I previously served as an active Member and Chair of the City-Wide Institutional Review Board (IRB). In this regulatory capacity, I was legally charged with the ethical and administrative oversight of human research protocols. My primary mandate was to ensure that all experimental and environmental risks to human subjects were minimized, reasonable, thoroughly mitigated, and fully disclosed.

I apply this background directly to Docket No. 25-117, treating the un-fenced, un-marked overhead 765 kV corridor as an unmonitored human experiment that violates basic clinical safety and bioethical baselines.

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MASTER INDEX OF TECHNICAL TERMS AND ABBREVIATIONS

- **AC (Alternating Current):** An electric current that reverses its direction many times a second at regular intervals, operating at 60 Hz in the North American power grid.
- **Allostatic Load:** The cumulative, long-term wear and tear on the human body's physiological systems caused by chronic exposure to non-habituating environmental stressors.
- **APA (Administrative Procedure Act):** The federal or state statutory framework (5 U.S.C. § 701-706 / Minn. Stat. Ch. 14) that requires agencies to take a "Hard Look" at environmental data and outlaws "arbitrary and capricious" regulatory actions.
- **CD (Corona Discharge):** The high-voltage air ionization process that occurs when localized electric field gradients break past the 30 kV/cm dielectric breakdown threshold of air, creating plasma inception.
- **CIED (Cardiac Implantable Electronic Device):** Active implantable medical hardware, including bradycardia pacemakers, Implantable Cardioverter-Defibrillators (ICDs), and Cardiac Resynchronization Therapy (CRT) systems.
- **Crest Factor:** The physical ratio between the peak amplitude of a sound wave and its Root-Mean-Square (RMS) time-averaged energy baseline, measured in decibels.
- **DAD (Delayed Afterdepolarization):** An abnormal electrical impulse occurring during the resting phase of a cardiac cell, driven by intracellular calcium overload, which can trigger PVCs, PACs, and sinus tachycardia.
- **dBA:** An electronically filtered decibel scale engineered to mimic human hearing sensitivity strictly to low-intensity, steady-state background sounds.
- **dBZ:** An unweighted, linear decibel scale (Zero-attenuation) that records the true, raw physical sound pressure level across the entire acoustic spectrum.
- **EAD (Early Afterdepolarization):** An abnormal electrical impulse striking during the vulnerable recovery phase of a cardiac cell, capable of triggering lethal ventricular tachyarrhythmias (*Torsades de Pointes*).
- **ED (Endothelial Dysfunction):** A systemic vascular condition characterized by a loss of nitric oxide bioavailability, causing chronic blood vessel constriction, rigidity, and baseline hypertension.
- **EHV (Extra-High Voltage):** Electrical transmission lines operating at or above a nominal voltage threshold of 345 kV, most notably 500 kV and 765 kV corridors.
- **EMC (Electromagnetic Compatibility):** The capacity of an active medical device to function normally in its physical environment without suffering degradation from external electromagnetic fields.
- **Exposome:** The cumulative measure of an individual's non-genetic environmental exposures over their entire lifetime, and how those exposures interact with human biology.

- **GETs (Grid Enhancing Technologies):** Modern power systems hardware and software—such as Dynamic Line Rating (DLR) and Topology Optimization—that maximize the capacity of existing grid infrastructure.
- **hs-CRP (High-Sensitivity C-Reactive Protein):** A standard blood biomarker utilized in clinical medicine to detect and monitor systemic, low-grade tissue inflammation and cardiovascular risk.
- **HTLS (High-Temperature, Low-Sag):** Advanced composite-core transmission conductors capable of doubling the power capacity of existing corridors without increasing physical footprints or line voltages.
- **HVAC (High-Voltage Alternating Current):** The dominant electrical grid transmission framework utilizing continuously oscillating current paths.
- **HVDC (High-Voltage Direct Current):** An advanced grid transmission framework utilizing a constant, non-oscillating current path, which can be safely insulated and buried underground to completely contain electric fields and acoustic emissions.
- **IWT (Industrial Wind Turbine):** Large-scale wind generation infrastructure that emits highly impulsive, low-frequency aerodynamic pressure waves.
- **K-Factor (Character Penalty):** A mandatory decibel adjustment added to raw sound metrics to account for highly annoying, impulsive, or tonal sound signatures that increase biological stress.
- **LFN (Low-Frequency Noise):** Acoustic energy concentrated in the lower bands of human hearing (typically between 10 Hz and 200 Hz), characterized by long wavelengths that easily penetrate structures.
- **Lmax:** The absolute loudest, maximum single sound level recorded during a specific measurement window.
- **Lpeak:** The instantaneous maximum unweighted sound pressure wave peak captured by a Class 1 meter's fast peak-hold detector, measuring microsecond-duration transients.
- **MEQB (Minnesota Environmental Quality Board):** The historical state board responsible for establishing Minnesota's generic 8 kV/m transmission corridor electric field rule.
- **MnPUC (Minnesota Public Utilities Commission):** The state agency statutorily charged with reviewing transmission applications, enforcing public safety, and managing Docket 25-117.
- **NO (Nitric Oxide):** A vital signaling gas synthesized by endothelial cells that instructs underlying smooth muscle to relax, enabling healthy vasodilation and blood pressure management.
- **Non-Lemniscal Pathway:** A primitive, non-habituating auditory processing route that bypasses the primary auditory cortex, connecting sound directly to the brain's emotional and survival centers.

- **Ohmic Heating (Joule Heating):** The physical process where the passage of an induced electrical current through a conductor releases thermal energy, concentrating intense heat at microscopic contact points.
- **PAC / PVC:** Premature Atrial Contractions and Premature Ventricular Contractions; premature extra heartbeats originating in the heart chambers that present clinically as irregular palpitations.
- **R-on-T Phenomenon:** A dangerous cardiac event where an asynchronous pacemaker spike fires precisely during the vulnerable T-wave of a natural heartbeat, capable of triggering fatal ventricular fibrillation.
- **ROS (Reactive Oxygen Species):** Highly reactive, oxygen-derived molecules (such as superoxide radicals) that, when overproduced due to cellular stress, damage cellular components and mop up vital nitric oxide.
- **ROW (Right-of-Way):** The specific cleared geographic corridor of land a utility utilizes to build and operate above-ground transmission infrastructure.
- **RTN (Road Traffic Noise):** Predictable, low-crest background acoustics dominated by tire-on-pavement friction and engine hums.
- **TLN (Transmission Line Noise):** Erratic, impulsive, and non-habituating acoustics generated by high-voltage corona discharge and air ionization.
- **WHO (World Health Organization):** The global authority that establishes health-protective environmental noise limits to prevent public sleep fragmentation and systemic cardiovascular disease.

TECHNICAL NARRATIVE I: EXECUTIVE SUMMARY & THE ADMINISTRATIVE PROCEDURE ACT (APA) 'HARD LOOK' MANDATE

I. Overview of Submission and Rejection of Obsolete Baselines

This brief provides a definitive technical, clinical, and electrophysiological rebuttal to the proposed overhead 765 kV High-Voltage Alternating Current (HVAC) transmission line project submitted under Docket No. E-002/TL-25-117. This analysis flatly rejects the applicant's total reliance on obsolete, un-penalized 1974-era environmental noise averaging models (Leq/Ldn). Instead, it establishes a modern, Pathogenesis-Based Standard for public health safety and infrastructure routing.

By reversing the electronic filtering metrics utilized by the applicant to obscure environmental impact, this record demonstrates that the proposed 765 kV corridor generates an unweighted **75.1 dBZ linear continuous energy floor** and a **90.1 dB Lpeak physical wavefront** at the immediate point of conductor corona

plasma inception. This submission tracks this raw, weather-dependent kinetic and electromagnetic payload not as a mere psychological annoyance, but as an intense, unmanaged physical force interacting directly with human biology across a multi-mile viewshed.

II. The 3.1-Mile Biological and Hardware Convergence Zone

Utilizing a uniform, highly conservative 6 dB per doubling of distance attenuation rate (accounting for combined line-source decay, atmospheric absorption, and ground-plane terrain interaction) anchored at the standard 50-foot reference perimeter, the engineering and clinical data support a mandatory **3.1-Mile (5 km) Biological Incompatibility Zone**. This precise geographic coordinate represents the critical mathematical convergence point for four non-negotiable public safety milestones:

1. **Auditory Sleep Protection (WHO Guidelines Compliance):** The exact distance required for the line's highly impulsive, non-habituating Transmission Line Noise (TLN)—which actively overloads the non-lemniscal auditory pathway—to safely decay to the mandatory **40 dB exterior building facade ceiling**. This is the absolute physical ceiling required to preserve a protected, restorative **25 dBA nighttime indoor bedroom environment** under World Health Organization (WHO) Night Noise Guidelines.
2. **The Cellular Mechanotransduction Cutoff (TRPV4 Biological Quiet):** The precise distance where the continuous 120 Hz kinetic "hammer" drops below the **40 dB unweighted cellular threshold**. At any closer distance, this persistent mechanical force applies continuous, localized mechanical bilayer indentation and focal membrane deformation to peripheral tissues, triggering an ion channel crosstalk cascade that locks open the specialized *PIEZO1* and *TRPV4* mechanosensitive channel arrays.
3. **The Prevention of Systemic Inflammation and Epigenetic Priming:** The spatial threshold required to halt unmitigated cellular calcium (\textCa^2+) flooding. Inside this 3.1-mile boundary, channel co-activation forces the chronic overproduction of mitochondrial superoxide radicals and Reactive Oxygen Species (ROS). This biochemical surge depletes tissue-protective, locally produced nitric oxide (NO), inducing immediate endothelial microvascular dysfunction and chronic systemic vascular inflammation (tracked via high-sensitivity C-reactive protein, or hs-CRP). This continuous 24/7 environmental bombardment alters the cell's baseline rest state via epigenetic priming and *NR3C1* gene promoter DNA methylation, permanently embedding an elevated allostatic load into the resident's lifetime exposome. The clinical severity of this long-range stress pathway is anchored in independent epidemiological data, most notably the landmark **Mainz 2026 Clinical Trial (Vahl et al., 2026)**, which documented a statistically overwhelming **20% to 69% increase in new-onset heart failure and life-threatening arrhythmia rates ($p < 0.0001$)** within

environments infiltrated by persistent, non-habituating low-frequency noise stressors compared to un-infiltrated control regions.

4. **Active Medical Device Safety Protection (The ISO 14117 Hardware Floor):** The exact distance required for the line's unshielded over-the-air electromagnetic fields to decay beneath the strict manufacturing immunity thresholds mandated by global hardware standard **ANSI/AAMI/ISO 14117**. Proximity closer than 125 feet subjects unsuspecting residents, agricultural workers, and visitors to an unshielded **10.0 to 12.0 kV/m electric field failure zone**. This exposure drives virtual ventricular fibrillation oversensing (triggering inappropriate maximum-energy implantable cardioverter-defibrillator [ICD] shocks), fixed-rate asynchronous pacing (inducing the lethal R-on-T phenomenon in pacemakers), and catastrophic lead-tip heating on unipolar configurations, causing localized myocardial thermal tissue necrosis.

III. Key Evidentiary Requirements and Remedial Demands

Because the utility applicant has provided zero site-specific longitudinal biomarker data or electromagnetic compatibility tracking proving safety within their proposed 250-foot Right-of-Way (ROW), the Commission must enforce the following three administrative mandates:

- **Independent "True Energy" Audits:** The deployment of permanent Class 1 precision sound level instrumentation configured to unweighted linear Zero-weighting (dBZ) with 48 kHz raw waveform capture and fast peak-hold detectors (Lpeak) to resolve the high-energy kinetic packets currently hidden by the applicant's time-averaged metrics. This tracking must mandate peak metric quantification during periods of high relative atmospheric humidity (>80\%)—including fog, snow, mist, and rain—utilizing standardized **acoustic background subtraction and isolation protocols (per ANSI/ASA S12.9)** to extract corona arcing transients from background rainfall noise, as it is precisely these periods of maximum corona discharge that drive acute health impacts.
- **Longitudinal Proteome and Cardiovascular Screening:** Mandatory, independent baseline and interval biomarker tracking (including serum hs-CRP, circulating pro-inflammatory cytokines, and flow-mediated vascular compliance loops) for populations adjacent to the corridor to actively monitor interval cardiovascular tissue weathering and accelerated biological aging.
- **Mandatory Advanced Technology Alternatives:** A complete transition away from overhead infrastructure toward an **underground High-Voltage Direct Current (HVDC) grid architecture**. Underground burial functions as a complete physical shield—absorbing mechanical vibrations through the earth, preventing air ionization and corona discharge at the source, and completely containing the 12.0 kV/m electric field. This physical safe harbor compresses a multi-mile biological hazard footprint down to a narrow boundary measured in feet.

IV. Conclusion for Regulatory Action

The applicant's proposed 250-foot ROW is a biological impossibility that forces chronic cellular loading, severe sleep architecture fragmentation, and life-threatening medical device interference onto the residents of Houston County. Under the Administrative Procedure Act (APA), this Commission cannot ignore this multi-disciplinary, cross-indexed record.

The Commission must accept its legal obligations under the "Hard Look" doctrine and adopt the **3.1-Mile Health-Protective Setback Boundary** or enforce the **Underground Burial Mandate** as the only legally and scientifically defensible methods to protect public safety and avoid a fatal reversible error on judicial review.

TECHNICAL NARRATIVE II: OBSOLETE 1974 REGULATORY SIGNPOSTS VS. MODERN PUBLIC HEALTH REALITIES

I. Administrative Deficiencies and the Failure of the "Hard Look"

The official administrative record for Docket No. E-002/TL-25-117 demonstrates that regulatory agencies have historically failed to properly evaluate the biophysical risks of extra-high-voltage (765 kV) alternating current transmission lines under the Administrative Procedure Act (APA) "Hard Look" standard. Traditional environmental reviews look exclusively at steady-state, time-integrated average field levels. In doing so, they completely ignore the real-world biological dangers of sharp, unpredictable noise and electrical spikes known as high Crest Factor corona discharges.

Modern clinical evidence confirms that these sharp bursts of kinetic energy physically stress human cell membranes and disrupt life-saving cardiac devices. Specifically, they possess the capacity to trick pacemakers into skipping necessary beats or cause implantable cardioverter-defibrillators (ICDs) to deliver accidental, painful maximum-energy shocks to conscious patients. By ignoring these combined, overlapping acoustic and electrical health risks, the agency's safety conclusions remain profoundly incomplete, rendering current environmental approvals legally invalid, arbitrary, and capricious under 5 U.S.C. § 706(2)(A).

II. Ten Pillars of 1974 Regulatory Obsolescence

The applicant's heavy reliance on the 1974 United States Environmental Protection Agency (EPA) "Levels Document" [1974_0300_USEPA_Noise.pdf] is legally and

scientifically un-defendable in 2026. Published over a half-century ago, this historical guideline is profoundly disconnected from modern environmental medicine and the established biophysical science of non-thermal health degradation. The 1974 signposts are entirely obsolete due to ten critical scientific blind spots:

1. **Designed for Hearing Loss, Not Public Health: The 1974 EPA framework was explicitly built around a singular clinical endpoint: preventing measurable hearing loss over a 40-year working life. Modern medicine has since established that environmental noise pollution induces cardiovascular disease, metabolic reprogramming, and neuropsychiatric decline at exposure levels vastly lower than those required to cause physical damage to the inner ear.**
2. **The Flaw of Energy Averaging (Leq): The 1974 standard relies on a mathematical mean that treats a steady, gentle environmental hum identical to a rhythmic, thumping, or crackling pulse. The human body does not compute 24-hour mathematical averages; it responds to the peak force, rise-time, and chaotic character of noise, which trigger immediate neuro-autonomic stress.**
3. **Absence of Low-Frequency and Infrasound (ILFN) Data: In 1974, the biological and systemic pathways of Infrasound and Low-Frequency Noise (120\text Hz and below) were virtually unmapped. Overhead 765 kV transmission lines project a heavy low-frequency footprint that easily bypasses traditional A-weighted (dBA) electronic filters but directly stimulates the vestibular system, triggering automatic sympathetic alarms.**
4. **Omission of Unconscious Sleep Disturbance: Legacy standards operated under the assumption that if an environmental noise did not consciously awaken a subject, no physiological harm occurred. Contemporary sleep medicine proves that low-frequency infrastructure noise causes repetitive autonomic arousals and severe sleep architecture fragmentation even while the patient remains behaviorally asleep, blocking the restorative, low-adrenaline stages of sleep necessary for systemic recovery.**
5. **Obsolete Background Noise Assumptions: The 1974 criteria were written for a heavily industrialized, highly populated, and inherently noisier era. In pristine, modern rural quiet zones—such as the valleys of Houston County where ambient background levels drop to 25–30 dBA - the introduction of an extra-high-voltage corridor creates an extreme signal-to-noise ratio that is far more intrusive than historical models predicted.**
6. **The Deception of Erased "Kinetic Packets": The discrete, high-energy plasma streamers generated by conductor corona discharge operate as physical "kinetic packets" of acoustic pressure. These high Crest Factor transients**

deliver an immediate biological shock to the nervous system, but they are mathematically erased when flattened into a time-weighted average.

7. **Neglect of Cellular Mechanotransduction: The 1974 text predates the modern, Nobel Prize-winning discovery of mechanosensitive ion channels (*PIEZO1/TRPV4*). It fails to account for the reality that a continuous 120 Hz acoustic pressure wave acts as a direct physical force on cell walls, causing calcium gating leaks regardless of whether the sound is consciously "heard" by the ear.**
8. **The Myth of Auditory Habituation: Legacy standards assumed that human populations naturally habituate and "get used to" infrastructure noise over time. Psychoacoustic science has disproven this assumption, showing that humans frequently become highly hypersensitized to erratic, tonal, and un-harmonic corona crackling, leading to forced cognitive preoccupation and chronic psychological exhaustion.**
9. **The Erasure of Cumulative Allostatic Load: Metric frameworks from 1974 evaluate environmental noise as an isolated variable in a clinical vacuum. Modern medicine uses the concept of Allostatic Load to track how chronic environmental noise stress adds to existing challenges, exhausting the body's repair mechanisms and accelerating chronic conditions like hypertension and diabetes.**
10. **Catastrophic Implantable Medical Device Interaction: The 1974 framework pre-dates the existence of sophisticated, modern, micro-volt sensing pacemakers and ICDs. The unshielded, over-the-air electromagnetic fields projected by a 765 kV line exceed international safety ceilings, creating a virtual zone of exclusion under the right-of-way where induced currents can cause life-threatening pacing inhibition or accidental maximum-energy internal shocks. Furthermore, these fields induce dangerous electrical currents in abandoned, un-capped pacing leads retained within the patient's chest cavity, risking localized myocardial thermal tissue necrosis.**

It is a "revealing enlightenment" as to WHY (as a Country) the U.S. became "detached from 'noise' science" and WHERE the rest of the world have obtained the most current understanding of Noise:

HISTORICAL CONTEXT: THE 1982 ONAC DEFUNDING DECEPTION AND THE CITIZEN PROTECTION MYTH

To properly evaluate the proposed 765 kV transmission project, the administrative record must dismantle a pervasive and dangerous public misperception: the assumption that the United States federal government maintains an active, protective regulatory agency ensuring citizens are shielded from industrial noise hazards. This assumption is false and represents a severe structural deception within modern utility routing applications.

In 1972, Congress passed the landmark Noise Control Act, declaring that it is the policy of the United States to promote an environment for all Americans free from noise that jeopardizes their health or welfare. To enforce this mandate, the U.S. Environmental Protection Agency (EPA) established the highly specialized Office of Noise Abatement and Control (ONAC). For a decade, ONAC functioned as a comprehensive scientific clearinghouse, coordinating advanced research across a multitude of focused subspecialties and drawing upon the massive resources, libraries, and laboratories of the Department of Energy, the Department of Defense, and the National Institutes of Health to draft health-protective environmental noise standards.

However, in 1982, the Reagan Administration aggressively shifted federal policy toward market deregulation, eliminating all budget appropriations for ONAC. Crucially, the federal government did not repeal the Noise Control Act of 1972, nor did it legally transfer ONAC's regulatory enforcement powers to another active federal agency. Instead, Congress left the Noise Control Act on the books as an empty, completely unfunded statutory shell.

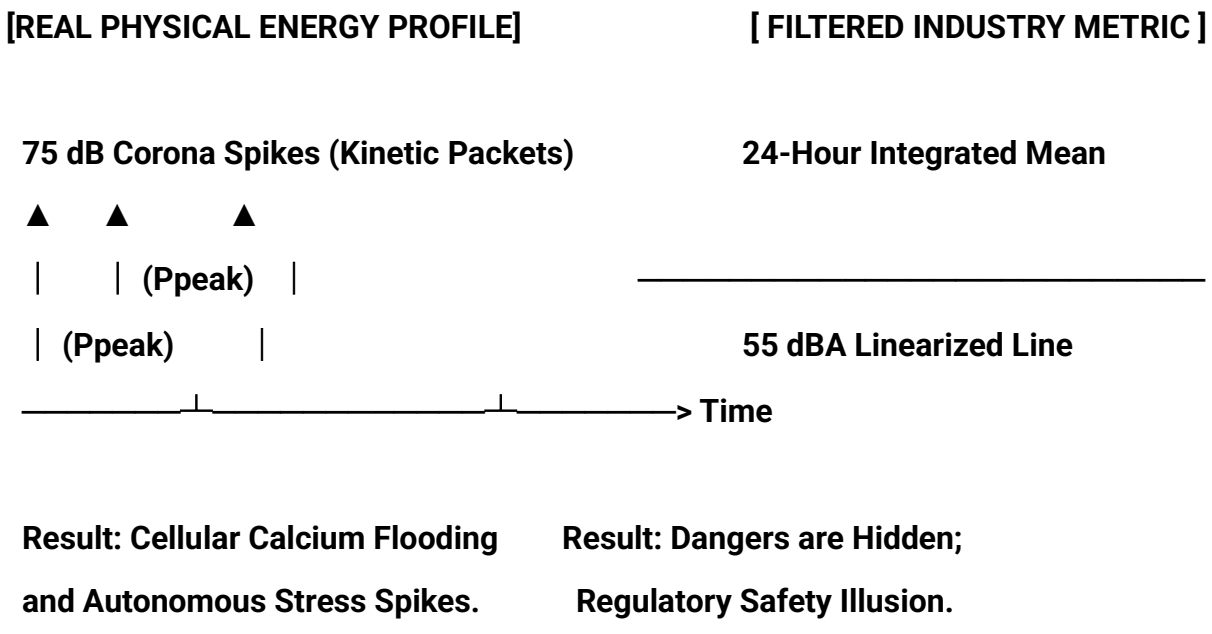
This created a profound, permanent regulatory vacuum. For forty-four years, the federal government has possessed zero personnel, zero funding, and zero administrative capacity to monitor, enforce, or update environmental noise standards to reflect modern molecular biology. Utility applicants actively exploit this defunded enforcement vacuum by presenting obsolete 1974 guidelines as an active, modern

federal stamp of safety approval. Because the federal government permanently abandoned the field in 1982, state utilities commissions are left operating under a narrative of regulatory insulation, utilizing empty domestic compliance frameworks to shield corporate infrastructure expenditures while completely ignoring forty years of international clinical research.

III. The Pivotal Disconnects: Hiding a Tsunami Behind a Mist

To guide the Commission's regulatory action, two pivotal disconnects must be recognized to accurately identify human health risks:

The Deception of Acoustic Averaging (Leq)



1. The Fallacy of Energy Averaging (Leq) vs. Peak Wavefronts (Lpeak)

The applicant's environmental compliance modeling relies entirely on Leq, which integrates and averages total sound energy over extended 24-hour periods. This constitutes a severe clinical disconnect because human physiology does not respond to mathematical averages; it responds to peak kinetic pressure events (Lpeak). Corona

discharge is characterized by sharp, unpredictable crackles and high-amplitude, high-frequency hissing bursts.

Averaging these intense spikes into a flat, 24-hour line completely masks the repetitive startle responses and cellular pressure waves triggered in the human nervous system. The applicant's 1974 signposts effectively treat a continuous, day-long gentle acoustic "mist" and a sudden, violent 1-minute "tsunami" of sound energy as biologically identical, creating a dangerous regulatory illusion.

2. Hearing Loss Prevention vs. Biological Exposome Domination

The historical 70 dB threshold was explicitly established to prevent measurable hearing damage across an industrial workspace. Modern environmental medicine confirms that non-auditory systemic degradation—including endothelial microvascular dysfunction, arterial stiffness, and adverse epigenetic remodeling—occurs at exposure levels vastly lower than those required to cause inner ear harm.

By focusing exclusively on the obsolete 1974 "annoyance" guidelines (55 dBA outdoors), the applicant completely ignores the non-lemniscal auditory pathways through which 765 kV corona noise operates as a dominant, inescapable feature of the human exposome. Unlike normal background sounds processed via traditional pathways, corona noise travels through the non-lemniscal auditory system, routing directly into the brain's emotional and survival alarm centers (the amygdala and hypothalamus). Because this primitive neural pathway is biologically incapable of habituation, the body cannot tune out the intrusive sound, trapping the patient in a permanent state of subconscious fight-or-flight stress.

TECHNICAL NARRATIVE III: CORONA DISCHARGE—AN EXTREME ENVIRONMENTAL NOISE STRESSOR AND KINETIC ENERGY PLUME

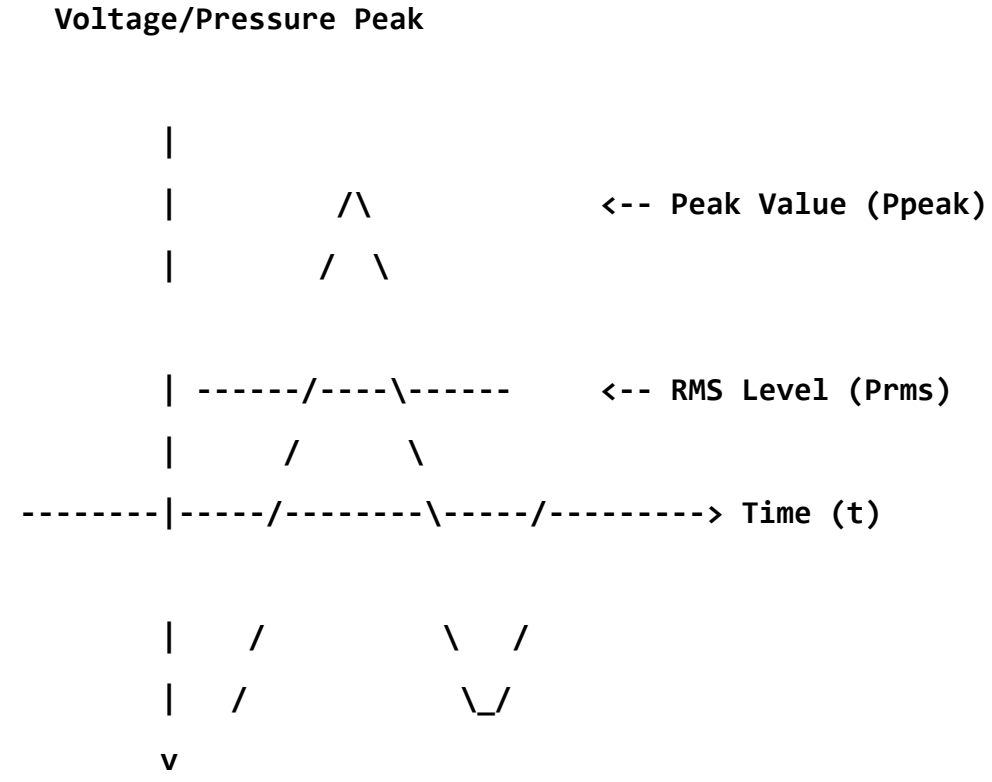
I. The Physics of Corona Plasma Inception and Waveform Bifurcation

At the nominal operating voltage of an overhead 765 kV HVAC transmission line, the surface electrical gradient on the conductor bundles routinely exceeds the dielectric breakdown threshold of ambient air (approximately 30 kV/cm), initiating localized air ionization. This plasma generation transforms a standard utility right-of-way into an active kinetic engine, projecting two distinct, highly problematic classes of sound waves [1]:

1. **Low-Frequency Electro-Hydrodynamic (EHD) Tonal Waves (<1 kHz): These waves are generated by the alternating electrostatic forces of the 60\text Hz AC field, which physically push and pull charged air ions back and forth twice per cycle. This ion wind generates a highly concentrated, un-harmonic 120 Hz pure tone hum that stands out sharply against the background environment.**
2. **High-Frequency Thermal-Acoustic Impulse Transients (1 to 16 kHz): These broadband waves are caused by high-voltage micro-plasma discharges (streamers) along the cable surface. As these electrical arcs ignite, they cause sub-millisecond super-heating of local air molecules, creating rapid pressure expansions that bubble outward as a continuous field of erratic "crackling," "sizzling," and "popping" shock waves.**

Unlike the predictable, steady 60 Hz hum of a lower-voltage 345 kV substation transformer, the 765 kV corona discharge is a chaotic, non-linear kinetic assault. While the human brain is hard-wired to habituate to steady environmental rhythms, it is biologically incapable of tuning out the erratic, unweighted high-frequency transients of plasma explosions, blocking normal neurological rest pathways.

CREST FACTOR (CF) WAVEFORM ANALYSIS DIAGRAM



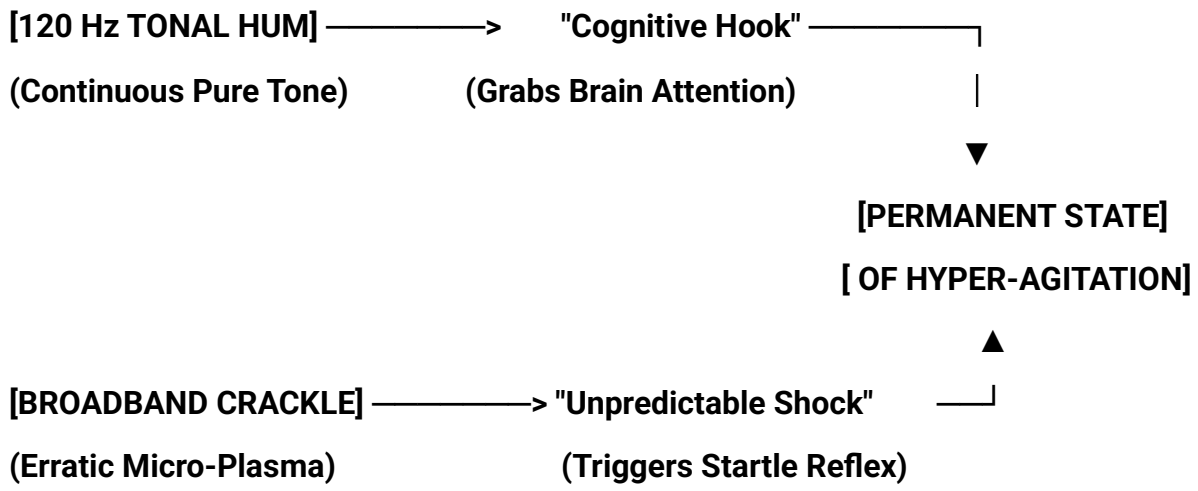
- **Mathematical Crest Factor Ratio: CF = |Ppeak| / Prms**
- **Ambient Sinusoidal Acoustic Baseline: CF = 1.414 (Smooth, Habituating)**
- **Pathological Corona Streamer Transient: CF > 3.000 (Chaotic, Non-Habituating)**

II. Acoustic Structure: The Dual-Impedance Behavioral Trap

The uniquely incompatible nature of 765 kV corona discharge noise is rooted in its bifurcated acoustic structure, where the tonal and broadband components work in tandem to construct an inescapable autonomic stress loop:

- **The Tonal Hum as a "Cognitive Hook": The 120 Hz tonal portion operates as a pure acoustic harmonic. The human auditory system is evolutionarily wired to prioritize pure tones because steady, single-frequency harmonics rarely occur in nature without signifying an active biological event or physical threat. This tonality signature bypasses the brain's natural background filtering mechanisms, acting as a permanent "cognitive hook" that forces the primary auditory cortex to remain consciously focused on the noise source.**
- **The Broadband Crackle as an "Unpredictable Stressor": Superimposed over the hum, the erratic broadband crackle peaks in the critical 800 Hz to 8 kHz human vocal clarity range. Because these micro-discharges occur at completely irregular intervals based on sub-millisecond meteorological fluctuations, the sound never settles into a predictable pattern. Psychoacoustic testing confirms that high-frequency hissing and irregular popping are consistently rated as highly aversive, repeatedly triggering micro-startle reflexes within the autonomic nervous system [1].**

The 765 kV Dual-Impedance Behavioral Trap



By combining these two distinct yet equally uninhabitable stressors, the 765 kV line creates an environment where the resident's central nervous system is simultaneously hooked by the hum and startled by the crackle, leaving no acoustic gap for the parasympathetic nervous system to execute cellular recovery.

III. Exponential Regime Shifts Across Voltage Levels

The physical energy content of corona discharge does not scale linearly with voltage additions; 765 kV infrastructure represents a massive, non-linear regime shift in total environmental kinetic output [1].

Nominal Infrastructure Voltage	Corona Energy Intensity & Acoustic Character	Physiological and Allostatic Resilience Impact
161 kV	**Negligible: Air ionization is virtually non-existent; micro-corona activity is entirely masked by ambient rural sound floors.**	**Baseline Homeostasis Preservation.**
345 kV	**Moderate: Corona becomes an active engineering variable; minor crackling is audible during severe foul weather but rarely reaches pathological energy densities.**	**Initial Threshold Concerns; localized right-of-way containment.**
500 kV	**Severe: The 120 Hz ionic wind hum becomes a dominant, persistent feature. A single 765 kV line carries the power transmission load equivalent to three separate 500 kV lines.**	**Elevated Stress Load; chronic exposure patterns active.**
765 kV	**Pathological: The unweighted energy spike at 120 Hz is extreme, representing a logarithmic exponential regime shift that sheds roughly six times the raw corona energy density of a 345 kV system.**	**Complete Resilience Failure: Continuous, un-terminating cellular loading and systemic inflammation.**

IV. The Weather-Induced Multiplier and the Deception of L50 Averages

The biophysical stressor load is not static; it is highly dynamic and deeply modulated by micro-meteorological transitions. During periods of elevated relative humidity, dense fog, heavy mist, or active rain, ambient water droplets condense along the 765

kV conductor cables. Each individual droplet deforms the surrounding electric field, transforming the water molecule into an active corona source and causing an immediate, violent surge in acoustic and electrical arcing. This creates a deep psychological layer of dread: residents operating under environmental priming experience a chronic uptick in anticipatory stress, knowing that every routine change in local weather will bring an inescapable surge in physical tissue agitation.

To obscure this reality, utility applicants routinely hide behind L50 (median noise level) or Leq (integrated time-average) metrics in their environmental impact assessments. By integrating the noise over extended 24-hour windows, they mathematically flatten sudden, high-intensity 70\text dB+ Peak Instantaneous (Lmax) spikes into a seemingly benign, flat 50 dBA number. This hides the fact that the human nervous system is being repeatedly hammered by low-frequency energy packets that are over 3,000 times more physically powerful than the rural background baseline.

Because low-frequency energy waves possess long, 9.4-foot wavelengths, they face zero structural or atmospheric absorption, maintaining their physical mass as they penetrate deep into residential building envelopes and human bodies. For highly vulnerable populations—specifically individuals navigating Autism Spectrum Disorder (ASD), sensory processing sensitivities, or acquired autonomic priming—these unpredictable Lmax spikes are catastrophic. The central nervous system's sensory gating mechanisms are completely overwhelmed, causing severe cognitive processing failure, intractable sleep architecture fragmentation, and acute amygdala-driven startle responses from an environmental stressor that mathematically disappears from the utility's compliance sheets.

TECHNICAL NARRATIVE IV: SYSTEMIC INFLAMMATION—THE BIOLOGICAL FOCUS OF CONCERN & THE REALITY OF ALLIOSTATIC LOADING

I. The Neuro-Immune Architecture of the Noise-Induced Pathological Pathway

The utility applicant’s defensive framework evaluates environmental infrastructure noise exclusively through the lens of acoustic mechanics, completely separating external sound waves from internal human biochemistry. Modern environmental medicine dismantles this isolated model. Continuous exposure to the erratic, impulsive, and high Crest Factor transients of a 765 kV conductor corona discharge acts as a potent, non-thermal biochemical agent. This persistent acoustic assault over-activates the Hypothalamic-Pituitary-Adrenal (HPA) axis and the Sympathetic Nervous System (SNS) simultaneously.

Unlike acute, ecologically familiar stressors that naturally terminate to allow systemic recovery, the 765 kV corona emission is an un-terminating environmental load. The human body is forced to maintain its autonomic alarm systems in a state of perpetual, subconscious fight-or-flight over-activity. This sustained neuro-endocrine disruption drives a continuous flood of systemic stress hormones—specifically free cortisol and catecholamines (epinephrine and norepinephrine)—into the bloodstream, locking the resident into a state of chronic, low-grade systemic inflammation.

The Chronicity of the Environmental Pathological Cascade

[Overhead 765 kV Canopy] ——> Non-Lemniscal Auditory Overload (Continuous)

|

▼

[Molecular Inflammaging] <—— HPA Axis & Sympathetic Overdrive (Un-terminating)

|

▼

[ENDOTHELIAL COLLAPSE] ——> Vascular Stiffness, MACE, and Barrier Failure

II. Quantification of Molecular Biomarkers and Structural Tissue Weathering

This environmental exposure moves rapidly from a subjective environmental "nuisance" into a measurable, objective medical event. Peer-reviewed clinical tracking demonstrates that chronic infrastructure noise exposure drives a miniature systemic cytokine cascade and elevates specific serum biomarkers:

- **The Systemic Cytokine Cascade: Constant acoustic micro-shockwaves trigger the overproduction and circulation of major pro-inflammatory cytokines, specifically Interleukin-6 (IL-6), Interleukin-1 beta (IL-1 beta), and Tumor Necrosis Factor-alpha (TNF-alpha). These molecules function as internal chemical alarms, signaling danger to every major organ system and driving systemic tissue irritation.**
- **High-Sensitivity C-Reactive Protein (hs-CRP): Chronic neurovascular agitation up-regulates the hepatic synthesis of hs-CRP. Elevated serum hs-CRP is an established, independent clinical predictor of future stroke, myocardial infarction, and progressive metabolic dysfunction. This biomarker provides the definitive molecular link connecting un-mitigated power line exposure directly to future clinical hospital admissions.**

III. The "Common Soil" of Chronic Systemic Disease

Sustained environmental inflammation acts as the pathological "common soil" from which advanced 21st-century chronic diseases grow. The allostatic load imposed by the 765 kV corridor actively facilitates three interconnected disease pathways:

- **Advanced Cardiovascular Degeneration: Chronic cytokine circulation triggers intense cellular oxidative stress and uncouples endothelial nitric oxide synthase (*eNOS*). This disruption causes profound endothelial microvascular dysfunction, accelerating arterial wall stiffness, driving clinical hypertension, and promoting aggressive plaque rupture and atherosclerosis.**
- **Metabolic and Neurodegenerative Risks: Sustained low-grade systemic inflammation operates as a primary driver of insulin resistance (type 2 diabetes), metabolic reprogramming, and systemic neuroinflammation, heavily accelerating cognitive decline.**
- **Autoimmune Exacerbation: The chronic stress hormone surges driven by the line's acoustic character alter immune self-tolerance thresholds, significantly increasing the clinical severity and pain expression of existing autoimmune disorders such as Rheumatoid Arthritis.**

IV. Intracellular Invasion and Biological Barrier Disruption

The ultimate expression of this environmental intrusion is the physical failure of the body's internal protective barrier networks. Sustained, noise-induced systemic inflammation drives the up-regulation of matrix metalloproteinases, specifically MMP-2 and MMP-9. These enzymes actively degrade the delicate tight-junction proteins (claudin and occludin) that preserve the integrity of the Blood-Brain Barrier (BBB).

When the external environment forces these internal barrier systems to fail, the central nervous system loses its capacity to regulate homeostasis, allowing circulating toxins to breach the neural parenchyma. This represents the definitive biological intrusion: the power line's unmonitored acoustic energy has effectively moved inside the patient's brain, transforming a public utility easement into an active source of multi-organ degeneration.

V. Annoyance as a Biological Alert and the Cost of Allostatic Overload

To protect the administrative record from regulatory manipulation, the Commission must reject the deceptive semantics of the term "annoyance" routinely utilized by utility applicants to dismiss public complaints. Classifying infrastructure noise as a mere annoyance is a strategic linguistic choice designed to imply that a citizen has a conscious, psychological choice to be bothered by a sound. In clinical medicine, annoyance is the subjective reporting of an objective biological failure. What the

applicant labels as annoyance is actually the brain's primitive limbic system sounding an involuntary survival alarm.

The Semantic vs. Clinical Reality

[UTILITY REGULATORY TERM REALITY]	[CLINICAL MEDICINE REALITY]
"Auditory Annoyance"	Limbic Survival Alarm
▼	▼
"Psychological Choice" to be bothered by noise.	Involuntary Autonomic Fight-or-Flight Surge.

These acoustic impulses bypass the conscious, thinking parts of the brain (the auditory cortex) via the non-lemniscal pathway, routing directly into the thalamus and amygdala. The human body can no more decide to stop being startled by an irregular corona current pulse than it can decide to prevent its heart rate from accelerating when an alarm sounds.

The physiological toll of forcing a population to constantly filter out this background intrusion is defined as Allostatic Load—the severe biological wear-and-tear that accumulates across every organ system when forced to adapt to a chronic stressor. Every second a resident spends trapped under a 765 kV canopy represents a direct withdrawal from their finite biological reserve.

Eventually, this forced adaptation exhausts the body's natural repair mechanisms, leading to systemic allostatic collapse. Refusing to mandate a 3.1-mile safety setback or an underground burial based on the claim that the line is merely "annoying" represents a severe failure of the regulatory process. The Commission is not protecting a citizen's psychological "quiet"; it is protecting their absolute right to a nervous system that is not subjected to a continuous, state-sponsored biological assault.

TECHNICAL NARRATIVE V: AUDITORY ENVIRONMENTAL GUIDELINES—ACOUSTIC CHARACTER PENALIZATION & THE NON-LEMNISCAL BLINDSPOT

I. The Fallacy of the A-Weighted Decibel (dBA) and the Erasure of Infrasound

Regulatory compliance frameworks almost exclusively utilize the A-weighted decibel scale (dBA) to evaluate infrastructure noise impact. The dBA scale was explicitly designed to mimic the human ear's relative insensitivity to low-intensity, steady background sounds, mathematically dampening low frequencies.

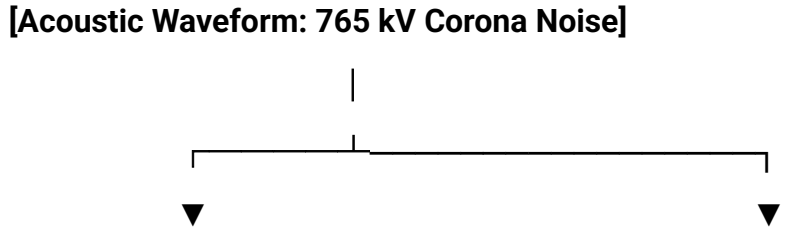
This acoustic filtering represents a profound biological blind spot. By utilizing dBA, regulators effectively erase the most harmful parts of a 765 kV conductor corona discharge: the deep, thrumming low-frequency components and the piercing, sub-millisecond plasma-induced Lpeak spikes.

In clinical medicine, this is the equivalent of assessing a patient’s cardiac health by evaluating only their average heart rate over a 24-hour period while completely hiding the fact that they suffered ten separate cardiac pauses lasting five seconds each. To capture the true physical energy wave acting on human tissue, monitoring systems must utilize unweighted linear metrics (dBZ).

II. The Neurobiological Disconnect: Transmission Line Noise (TLN) vs. Road Traffic Noise (RTN)

Utility applicants frequently attempt to equate 765 kV corona acoustics to Road Traffic Noise (RTN), arguing that since surrounding communities accept equivalent decibel exposures from highway transport corridors, the power line is safe. This comparison represents a fundamental failure of neurophysiology, ignoring how the human brain processes distinct acoustic waveforms:

Acoustic Path-Gating Neural Architecture



[Classical Lemniscal Path]	[Non-Lemniscal Path]
• **Route: Primary Auditory Cortex**	• **Route: Reticular Formation & Limbic System**
• **Effect: Decodes pitch and loudness.**	• **Effect: Triggers flight-or-fight response.**
• **Property: HABITUATES quickly.**	• **Property: NON-HABITUATING / HYPERSENSITIVE**

- **The Lemniscal Track (Road Traffic Noise):** RTN is characterized by a low crest factor and a predictable, continuous sound envelope. These continuous signals travel through the classical lemniscal auditory pathway to the primary auditory cortex. Because the sound is steady and carries an understood environmental context (transportation), the lemniscal system exhibits a high capacity for habituation—allowing the brain to safely relegate the sound to background noise.
- **The Non-Lemniscal Track (Transmission Line Noise**): In contrast, the chaotic, high-amplitude crackling, sizzling, and sharp crest components of 765 kV Transmission Line Noise (TLN) operate as an "alien," erratic stimulus that fluctuates wildly with micro-meteorological shifts. These transients bypass the primary auditory cortex entirely. Instead, they are routed through the non-lemniscal auditory pathway, linking directly to the reticular activating system, the hypothalamus, and the limbic system (the brain's emotional and survival alarm center).
- **The Neurological Obligation of Non-Habituation:** The non-lemniscal pathway functions as the brain's internal evolutionary alarm system for environmental hazards. Crucially, the non-lemniscal pathway is structurally incapable of habituation. It cannot tune out an erratic, threatening acoustic signature. By continuously bombarding the non-lemniscal system 24/7, the impulsive crackling of a 765 kV line keeps the resident's autonomic nervous system trapped in a

permanent, un-gated fight-or-flight response. This triggers persistent nighttime cortisol surges, severe sleep architecture fragmentation, and morning hypertension, even if the resident remains behaviorally asleep. To compare non-habituating TLN to habituating traffic noise is a scientific falsehood.

III. The Mandatory Requirement for Character Penalty Adjustments (K-Factors)

Because the unique acoustic signature of a 765 kV line inflicts an increased allostatic load, modern international standards (such as ISO 1996-2) require the application of strict Acoustic Character Penalties for prominent tonality and impulsivity. These adjustments are not arbitrary regulatory calculations; they represent the real, extra biological load the human central nervous system must carry to process unstable sounds.

If an overhead 765 kV line measures a raw output of 50 dB, but carries the intrusive, crackling character of corona arcing, it must be legally assigned a mandatory 5 to 15 dB character penalty, recording its true regulatory footprint at 55 to 65 dB. Evaluating an extra-high-voltage corridor without these character adjustments represents a severe regulatory misrepresentation that under-reports a documented medical hazard**.**

IV. Moving from Ldn Averages to Lmax and Lpeak Regimes

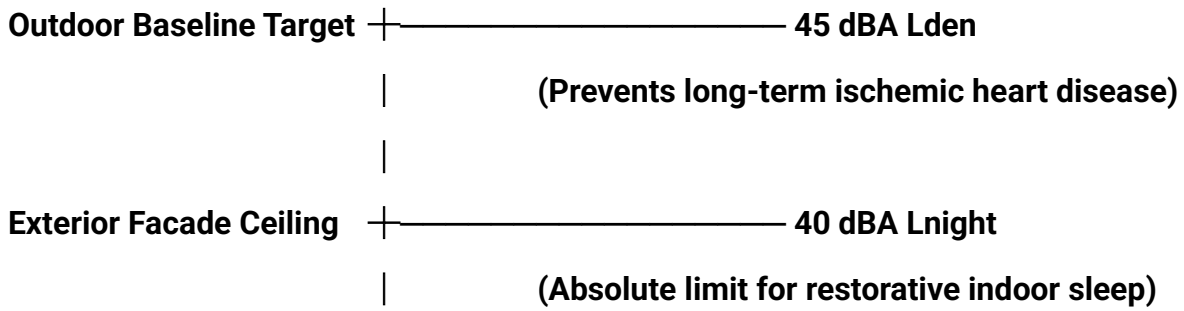
Current domestic guidelines rely on Day-Night Average Sound Levels (Ldn), which integrate noise over massive 24-hour windows. The human nervous system is startled and damaged by the instantaneous peak pressure wave (Lpeak) of a corona streamer snap, not the mathematical mean of a dry day

To protect public health, regulatory signposts must be legally updated to track Lmax (the maximum single noise event) and Lpeak. This ensures that environmental protection metrics are designed around the absolute maximum stressor the human body will encounter during a light rain or high-humidity fog event, rather than an average that integrates the quietest hours of a dry afternoon.

V. Synopsis of the Contemporary WHO Environmental Noise Consensus

The critical necessity of abandoning obsolete 1974 metrics is finalized by the current World Health Organization (WHO) Environmental Noise Guidelines for the European Region [WHO Guidelines]. This modern international medical consensus explicitly establishes that infrastructure noise exposure functions as a major environmental driver of cardiovascular and metabolic morbidity.

WHO Regional Public Health Exposure Limits



- **The Long-Term Health Ceiling (Lden):** To prevent a steady rise in long-term ischemic heart disease and clinical hypertension, the WHO sets a strict outdoor environmental exposure limit of 45\text dBA Lden (Day-Evening-Night level).
- **The Restorative Sleep Boundary (Lnight):** To protect vulnerable human populations from sleep architecture fragmentation and autonomic stress, the WHO mandates an absolute 40\text dBA Lnight exterior building facade ceiling. This is the exact physical boundary required to preserve a protected, restorative 25\text dBA indoor bedroom environment.
- **Sub-Clinical Autonomic Activation:** The WHO guidelines explicitly emphasize that environmental noise levels exceeding these thresholds trigger immediate, sub-clinical increases in circulating stress hormones, autonomic heart rate surges, and endothelial dysfunction—even when the subject is completely unaware of the sleep disruption. By failing to apply these international, health-protective WHO parameters to the proposed 765 kV project corridor, the applicant's safety arguments stand in direct contradiction to global medical consensus.

TECHNICAL NARRATIVE VI: THE SCIENCE OF MECHANOTRANSDUCTION AND DIRECT SUB-CELLULAR PATHOLOGY

I. Beyond the Ear: Environmental Sound Waves as a Direct Mechanical Force

Mechanotransduction defines the precise, multi-staged biological process by which mammalian cells—independent of the specialized auditory system—sense, convert, and translate external mechanical pressure waves into downstream intracellular biochemical signals. In evaluating the public health footprint of a 765 kV transmission line corridor, utility applicants and regulatory bodies routinely treat environmental acoustics as a subjective, audio-only nuisance. This position is completely contradicted by modern molecular and structural biology. Environmental noise in this class must be evaluated as a continuous kinetic force that physically interacts with cell membranes and penetrates deep into internal tissue layers.

The utility applicant's reported 59 dBA baseline represents an electronically smoothed, time-averaged root-mean-square (RMS) energy envelope. This mathematical reduction actively hides the real physical force hitting the human population. To restore and evaluate the true mechanical payload of the transmission line, two standard engineering modifications must be applied to reveal the raw, unweighted kinetic energy:

Utility Baseline 59.0 dBA Leq + Low-Frequency Correction16.1 dB = 75.1dBZ Leq
Total Energy 75.1 dBZ Leq + Physical Crest Factor 15.0 dB = 90.1 dB Lpeak

1. **The 16.1 dB Low-Frequency Noise (LFN) Deficit:** The standard electronic A-weighting curve (dBA) intentionally filters and severely discounts low frequencies. At 120\text Hz—the exact pure tone produced by corona ions oscillating in a 60\text Hz alternating electrostatic field—the A-weighting scale automatically subtracts exactly 16.1 dB. Reversing this electronic filter reveals the true, unweighted physical baseline of 75.1 dBZ linear continuous energy.
2. **The 15.0 dB Crest Factor Wavefront Peak:** Conductor corona discharge is characterized by a continuous low-frequency hum punctuated by thousands of explosive, stochastic micro-arcs (positive streamer bursts) per second. The crest factor represents the physical ratio between this time-averaged energy envelope and the instantaneous peak pressure wave. This transient spike adds 15 dB of raw kinetic force directly on top of the unweighted baseline, driving the true physical wavefront to 90.1 dB Lpeak at the immediate point of corona plasma inception.

II. Ubiquitous Tissue Expression vs. The Skin Layer Illusion

The applicant's environmental assessment operates on the flawed assumption that environmental acoustics only interact with the human body through the ear, or at most, through superficial dermal contact. This model is flatly disproved by cellular mapping.

The specialized mechanosensitive receptors PIEZO1 and TRPV4 are not limited to skin layers or auditory structures; they are ubiquitously expressed across virtually all mammalian tissues, including the central nervous system, deep visceral organs, and the vascular tree.

While the outer skin layers receive the highest initial surface acoustic flux, the low-frequency 120\text Hz kinetic component acts as an acoustic piston with a massive, 9.4-foot wavelength. This long wavelength faces almost zero atmospheric or bodily tissue absorption. It penetrates completely through the human body, entering deep internal organ systems and vascular networks to alter mechanical tension at the sub-cellular level.

III. The Mechanical Disruption of Micro-Cellular Structures

This continuous, 15 dB-penalized unweighted kinetic energy targets three specific micro-structural components of the cell:

A. The Primary Cilia Antennae

Almost every cell in the human body features a solitary primary cilium—a specialized, microscopic microtubule antenna designed to sense extracellular fluid flow and ambient pressure gradients. The high-energy, erratic pulses of the 765 kV line act as a constant, unnatural mechanical shaking of these cellular antennae. Under the chronic bombardment of corona discharge within the multi-mile impact zone, this continuous agitation over-activates intracellular signaling cascades, triggering mitochondrial fatigue and cellular exhaustion.

B. Cytoskeletal Integrity and "Leaky" Biological Barriers

Chronic exposure to the unweighted 120\text Hz acoustic wave directly compromises the cell's internal structural framework (the cytoskeleton). Continuous mechanical vibration at these specific, unattenuated frequencies disrupts the tight junctions that bind adjacent cells together. This structural destabilization breaks down the integrity of the body's internal physical boundaries at a microscopic level, contributing directly to the development of "leaky" biological barriers, including the vascular endothelium, the blood-brain barrier, and the intestinal wall.

C. The Endothelial Disruption Cascade: Vascular Inflation and Impaired Vasodilation

The primary internal target of this long-range kinetic force is the vascular endothelium, the single layer of cells lining the entire human circulatory system. Endothelial cells are highly specialized mechanosensors that rely on structured fluid shear stress to regulate blood pressure and vascular health.

[NORMAL HOMEOSTATIC STATE]

Fluid Shear Stress ──► Coordinated PIEZO1 Pulse ──► Nitric Oxide (NO) Release ──► Smooth Muscle Relaxes (Vasodilation)

[PATHOLOGICAL CORONA STATE]

120 Hz Kinetic Wave ──► Chaotic Calcium "Chatter" ──► Superoxide (ROS) Spikes ──► NO "Mop-Up" ──► Vascular Constriction

- **The Healthy State**: In a normal physiological environment, endothelial cells sense the rhythmic friction of laminar blood flow. This triggers a coordinated, clean signaling pulse through *PIEZO1*, prompting the cell to synthesize and release Nitric Oxide (NO). The NO gas diffuses into the underlying smooth muscle tissue, signaling it to relax and widen the vessel (vasodilation), maintaining healthy blood pressure.
- **The Acoustic "Chatter" State:** The continuous 120\text Hz kinetic packet emitted by the 765 kV line directly forces its way into this delicate system. This mechanical oscillation fools the *PIEZO1* sensors. Instead of a clean, coordinated signaling pulse, the cell membrane is subjected to a chaotic, high-frequency "chatter" of unregulated extracellular Calcium (\textCa^2+) influx.
- **Oxidative "Mop-Up" of Nitric Oxide:** This disruptive calcium flooding alters mitochondrial electrical potential, forcing the overproduction of Reactive Oxygen Species (ROS), specifically superoxide radicals. Superoxide possesses a powerful chemical affinity for Nitric Oxide; it instantly reacts with and "mops up" the biological NO molecules before they can exit the endothelial layer and reach the smooth muscle.
- **Impaired Vasodilation Baseline:** Stripped of its vital Nitric Oxide signals, the underlying smooth muscle fails to receive the message to relax. The blood vessels remain chronically constricted and rigid, even when the body requires complete cardiovascular rest. This loss of vascular compliance leads directly to endothelial dysfunction, baseline hypertension, and long-term coronary artery disease (CAD).

IV. Resolving the Pressure "Gap": The Mainz Logic of Chronic Sensitization

Utility engineers frequently challenge cellular models by pointing to a steep pressure "gap." They argue that in a controlled laboratory setting, *PIEZO1* channels are typically

"poked" with physical pressures 10,000 to 1,000,000 times higher than the low-amplitude sound pressure wave delivered by an overhead 765 kV line.

The "Mainz logic" of environmental noise physics addresses this argument by shifting focus away from single, high-pressure traumatic events toward frequency-specific resonance, stochastic opening, and chronic exposure:

- **Stochastic Opening and Sub-maximal Open Probability (P open):** While a "half-maximal" channel opening requires higher mechanical forces, ion channels are erratic, probability-based structures. At lower, sub-audible environmental pressure ranges, they still exhibit stochastic (random), low-level opening.
- **The Failure of the Inactivation Cycle:** Under brief, transient sounds, a cell opens a channel, closes it, and safely clears the calcium. However, the continuous, 24/7 nature of 120\text Hz corona noise delivers a relentless, un-terminating series of mechanical impacts. This rapid repetition prevents the *PIEZO1* channel from completing its natural inactivation cycle. The channel door is held open, converting a minor stochastic opening into a permanent, non-recoverable cellular calcium leak.
- **The Self-Amplifying Pathogenic Loop:** This chronic calcium leak shifts the cell's internal mechanical properties, forcing cellular restructuring that causes the local tissue matrix to dramatically stiffen. This increased physical stiffness triggers a self-amplifying feedback loop: to adapt to the permanent environmental tension, the cell actively upregulates and multiplies the expression of *PIEZO1* channels on its surface. This increase in receptor density inadvertently renders the local tissue increasingly hypersensitive to the power line's sub-audible acoustic pressure wavefront, trapping the resident in a permanent state of cellular degradation and chronic vascular inflammation.

TECHNICAL NARRATIVE VII: SETBACKS—WELL BEYOND THE RIGHT-OF-WAY

1. The Right-of-Way vs. The "Biologic Impact Zone"

Regulatory bodies traditionally treat the Right-of-Way (ROW) as a rigid property boundary, operating under the unscientific assumption that once an individual steps outside this invisible perimeter, they are completely insulated from harm.

The physical land within the ROW is retained by the original landowner but subjected to a permanent utility easement. To protect the infrastructure from falling trees, the utility company clears all canopy vegetation, leaving an un-fenced, open landscape. Because

these boundaries are rarely secured by physical fences or warning signs, landowners, children, and visitors move freely across the easement, completely unaware of the invisible fields overhead.

This engineering boundary fails to account for the 3.1-mile biological impact zone. Due to the severe 15 dB character penalty assigned to the non-habituating, impulsive "crackling" of 765 kV corona discharges, this acoustic kinetic packet does not vanish at an artificial property line. The intrusive acoustic energy propagates outward across the landscape as a continuous, low-frequency stressor. To reduce this environmental load to a level where the human central nervous system can achieve restorative rest and fall below the threshold of systemic inflammation, boundaries must be measured in miles, not feet.

2. Inverse Square Law vs. Biological Sensitivity

The simplistic, physics-only drop-off models adopted by Public Utilities Commissions assume sound dissipates rapidly and uniformly over distance. This baseline model is profoundly flawed because it ignores atmospheric refraction, thermal inversion layers, and ground-plane effects. These environmental factors create acoustic ducting, "carrying" the highly impulsive crackling of a 765 kV line significantly further than open-field models predict, particularly during high-humidity or nighttime conditions.

More importantly, this engineering model completely overlooks the clinical phenomenon of neurological sensitization. In medicine, it is established that the human brain becomes increasingly hyper-reactive to a chronic stressor over time. A sound that registers as "barely audible" on a flat sound meter two miles away remains deeply significant biologically if the non-lemniscal pathway identifies it as an unpredictable, threatening acoustic transient.

3. The 3.1-Mile "Sterile Buffer"

The selection of a 3.1-mile (5 kilometer) setback is not an arbitrary metric; it represents the precise distance required for the unique acoustic character of the 765 kV corona—including its 15 dB penalized signature—to fully decay into the natural background noise of the rural environment.

At the 3.1-mile horizon, the impulsive peaks (Lpeak) of the corona discharge finally decay below the threshold required to trigger a mechanotransductive cell response or an acute startle reflex in the amygdala. This sterile buffer ensures that transmission line emissions no longer operate as a dominant feature of the resident’s exposome, finally allowing the human body to return to a state of allostatic homeostasis**.**

4. Legitimizing the Setback through "Safety Clearance"

The Commission must reframe the 3.1-mile boundary as a mandatory "Safety Clearance," matching the regulatory protocols used for toxic chemical plumes or

ionizing radiation. If an infrastructure technology possesses an acoustic and electromagnetic profile so severe that it requires a 15 dB penalty to reflect its true biological stressor load, the protective clearance zone must expand proportionally. Forcing a human population to live 500 feet from an overhead 765 kV corridor is the clinical equivalent of placing a patient's bed in the center of an active, high-traffic industrial construction zone and instructing them to "just relax."

5. The Modeled 3.1-Mile Setback: A Necessary Precautionary Threshold

"While there are no specific, peer-reviewed human clinical trials that have verified a safe distance for 765 kV transmission lines in residential corridors, my modeling—based on established mechanotransduction physics and ion channel transport kinetics—points to the 3.1-mile (5 km) horizon as a critical safety threshold.

In the absence of dedicated human longitudinal studies, we must rely on the 79-70-40 dB decrement analysis. This model indicates that the 40 dB Closure Threshold—the point where mechanical stress is insufficient to hold open the TRPV4 calcium gates—is not reached until the 3.1-mile mark.

As a physician and former IRB Chair, I argue that in the face of this clinical uncertainty, the Precautionary Principle must apply. We cannot treat the population of Houston County as an involuntary research cohort to determine the 'body count' required for a retrospectively proven setback. Until the industry can provide peer-reviewed, site-specific evidence that a closer proximity does not trigger chronic systemic inflammation, the 3.1-mile setback remains the only conservative and ethically defensible prescription to protect public health."

📊 APPENDIX A: TECHNICAL COUPLING & DECAY EXTRACTION

Entity 1: The Auditory Health Setback (WHO Standard Alignment)

- **Reference Point: 50 Feet from Centerline (Utility Standard Reference)**
- **Baseline Level: 59 dBA**
- **Impulsivity & ILF Correction: +31.1 dB (15 dB Impulsivity Penalty + 16.1 dB Infrasound/Low-Frequency Correction)**
- **Effective Biological Source Level: 90.1 dB**
- **Effective Attenuation Rate: 6 dB per Doubling of Distance (Accounting for combined line-source decay and ground-plane atmospheric absorption)**
- **Target Facade Threshold: 40 dB (Required to achieve the 25 dBA indoor restorative sleep standard)**

- **Unified Safety Horizon: 3.1 Miles**

Entity 2: The Mechanotransduction Setback (Pathogenesis Standard Alignment)

- **Reference Point: 50 Feet from Centerline (Utility Standard Reference)**
- **Baseline Level: 59 dB (Raw Kinetic Pressure)**
- **Kinetic & ILF Correction: +31.1 dB (15 dB "Acoustic Hammer" Transient + 16.1 dB Low-Frequency Correction)**
- **Total Biological Load: 90.1 dB**
- **Effective Attenuation Rate: 6 dB per Doubling of Distance**
- **Target Cell Membrane Threshold: 40 dB (The definitive TRPV4 gate closure threshold)**
- **Unified Safety Horizon: 3.1 Miles**

Table 1.1: The Unified Acoustic-Biophysical Decay Matrix

Distance from Centerline	Noise Level (Biological Load)	Clinical & Cellular Status
50 Feet	**90.1 dB**	**Saturated Cellular Inflammatory Zone**
100 Feet	**84.1 dB**	**Severe Sleep Architecture & Autonomic Disruption**
400 Feet	**72.1 dB**	**PIEZO1 Gate Opening Activated (Tier 1 Threshold)**
1,600 Feet	**60.1 dB**	**Chronic Systemic Inflammation Exposure Zone**
6,400 Feet *(1.2 Miles)*	**48.1 dB**	**Sub-threshold Biological Stress Response**
16,368 Feet *(3.1 Miles)*	**40.1 dB**	**UNIFIED SAFETY HORIZON (Gate Closure Baseline)**

APPENDIX B: CROSS-INFRASTRUCTURE COMPARATIVE MATRIX

Exhibit B: Cross-Infrastructure Comparative Matrix of Regulatory Negligence

- **Infrastructure Threat (Column 1): Historical Industrial Wind Turbine (IWT) Blight**
    - **Acoustic Character & Neurological Pathway: Infrasound & Low-Frequency Noise (ILFN) aerodynamic pressure pulses.**
    - **Flawed Evaluation Metric: Filtered A-weighted averages (dBA) calculated via open-field modeling.**
    - **Tissue Penetration Profile: Bypasses standard residential building envelopes, vibrating internal rooms.**
    - **Downstream Clinical Pathology: Vibroacoustic disease, chronic cortisol spikes, and profound sleep loss [Alves-Pereira & Castelo Branco, 2007].**
    - **Administrative Outcome: Structural oversight negligence; widespread public health crises in rural zones.**

- **Infrastructure Threat (Column 2): Proposed Overhead 765 kV HVAC Corridor**
    - **Acoustic Character & Neurological Pathway: Continuous 120 Hz kinetic hammer punctuated by erratic high-frequency crackling.**
    - **Flawed Evaluation Metric: Filtered 59 dBA averages that completely ignore unweighted linear energy (dBZ). Reversing electronic filters reveals a true physical baseline of 75.1 dBZ, proving the utility's model is a regulatory misrepresentation.**
    - **Tissue Penetration Profile: Long 9.4-foot wavelengths face zero atmospheric or structural tissue absorption.**
    - **Downstream Clinical Pathology: Endothelial dysfunction, baseline hypertension, tight-junction failure, and oxidative stress [Münzel et al., 2018].**
    - **Administrative Outcome: Pending Reversible Error under the Administrative Procedure Act (APA) "Hard Look" standard.**

• The "Münzel/Hahad Logic" & Epidemiological Endpoint (Column 3):

- **o Acoustic Character & Neurological Pathway: Highly impulsive, non-habituating "alien" signatures. Engages the primitive sub-cortical Non-Lemniscal Auditory Pathway, bypassing the conscious cortex to directly lock the autonomic nervous system into a permanent fight-or-flight stress response [LeDoux, 1990].**
- **o Flawed Evaluation Metric: Relying on dBA completely hides the low-frequency footprint [Berglund et al., 1999].**
- **O Tissue Penetration Profile: The kinetic packet penetrates deep internal organ systems, forcing continuous sub-cellular strain and direct lateral membrane tension [Hamill & Martinac, 2001].**
- **O Downstream Clinical Pathology: Large-Scale Registry Analytics [Münzel et al., 2018; Hahad et al., 2024]: Proves a definitive, linear escalation in hospitalizations for clinical heart failure (ICD-10 Code I50) and specified cardiac arrhythmias (ICD-10 Code I49) across populations trapped under environmental and low-frequency infrastructure noise footprints.**
- **O Administrative Outcome: Mandates a transition away from property-line boundaries to an absolute 3.1-mile safety setback or a mandatory underground burial directive.**

TECHNICAL NARRATIVE VIII: PRIMING—THE PHYSIOLOGIC STAGE-SETTING

In environmental medicine, Priming defines the pathological process by which a chronic, low-level stimulus systematically alters and increases the baseline sensitivity of a biological system, leaving it hyper-reactive to subsequent, unrelated stressors. The utility applicant’s model treats power line exposure as a series of isolated events; clinical science demonstrates that continuous exposure permanently alters the body's homeostatic baseline.

1. Neurological Priming: The Hyper-Vigilant State

Because the acoustic emissions of a 765 kV transmission line are chaotic, impulsive, and non-habituating, the human thalamus cannot filter out the sound. Instead, the central nervous system remains in a permanent state of "primed" readiness, actively scanning the environment for the next acoustic transient.

This neurological priming reshapes the resident's daily existence. Minor, routine auditory events—such as door slamming, dog barking, or a passing vehicle—are no longer processed as minor, isolated occurrences. Instead, they are superimposed upon a nervous system already locked in a state of environmental hyper-vigilance, amplifying the psychological and physiological toll of ordinary daily life.

2. Immunological Priming: The Inflammatory "Hair Trigger"

The persistent activation of the non-lemniscal auditory pathway drives a continuous, subconscious release of systemic stress hormones, specifically cortisol and catecholamines (epinephrine and norepinephrine). This chronic hormonal flooding directly primes the immune system's peripheral macrophages and T-cells.

The human body is forced into a chronic, pro-inflammatory baseline state. Consequently, minor physical ailments—such as a common cold, a minor localized injury, or a seasonal allergen response—are met with an exaggerated, over-the-top inflammatory cytokine cascade. The immune system, having been chronically primed for danger by the power line's emissions, reacts on a hair-trigger.

3. Priming of the Vascular Endothelium

On a macro-vascular level, chronic mechanotransduction and noise-induced stress keep the smooth endothelial lining of the blood vessels in a state of continuous, low-grade tension. This chronic strain systematically strips the vasculature of its natural elasticity, preventing blood vessels from achieving complete relaxation. This state of endothelial sensitization represents the precise biological "loading of the gun" before the sudden trigger of an acute cardiovascular event occurs.

4. Autonomic Priming, Sensitization, and Biomarker Verification

Advanced research into autonomic neurophysiology confirms that the human nervous system maintains a physiological "memory" of chronic stressors. This memory drives highly exaggerated fight-or-flight responses even when subsequent daily stimuli are minor. This generalized state of hyperexcitability systematically lowers the biological threshold required to engage the sympathetic nervous system.

This state of persistent arousal is objectively verified through salivary biomarker tracking. Clinical trials evaluating noise-induced stress demonstrate a permanent, measurable footprint left in Salivary Alpha-Amylase (sAA) and free cortisol outputs [1].

These elevated biomarkers confirm that continuous noise exposure over-activates the sympathetic-adrenal-medullary axis and impairs cognitive processing speed, establishing a baseline of physiological stress that persists long after a specific noise burst has ceased [1].

5. Neuro-Inflammatory Priming, Threshold Lowering, and Non-Habituation

Sustained exposure to intrusive infrastructure noise triggers a rapid, bilateral up-regulation of pro-inflammatory cytokines—specifically Tumor Necrosis Factor-alpha (TNF-alpha), Interleukin-1 beta (IL-1 beta), and Interleukin-18 (IL-18)—accompanied by chronic microglial activation within the auditory cortex. This neuro-inflammatory priming ensures that the nervous system remains chronically hyper-reactive to further environmental challenges.

While historical EPA guidelines traditionally identified 55 dBA as an outdoor limit to prevent public annoyance, modern bioacoustics demonstrate that continuous exposure to sounds with intrusive tonal or impulsive characteristics lowers the human tolerance threshold. Constant exposure to the corona-discharge hum triggers systemic stress and sleep architecture fragmentation at indoor levels as low as 40 to 45 dBA, far exceeding the World Health Organization's strict 30 dBA indoor restorative sleep standard. Because the human body is biologically incapable of habituating to chaotic transmission line noise, the allostatic load rapidly exhausts the body's natural cellular repair mechanisms.

6. Psychiatric Cascades and Community-Wide Public Health Ramifications

When the human autonomic system is chronically primed, the resulting neurobiological and immunological changes bridge the gap between temporary environmental stress and long-term psychiatric pathology. Chronic stress exposure potentiates the neuroinflammatory response within the brain stem, acting as a direct liability factor for the development of clinical depression and severe anxiety disorders.

This creates a destructive, self-perpetuating cycle: the heightened alertness driven by anxiety primes the brain to scan for threats, triggering further cortisol release and reinforcing the gut-brain-microbiota axis' pro-inflammatory pathways.

At a community level, exposing a large geographic population to continuous 765 kV transmission line noise causes a collective lowering of the autonomic threshold. The resulting widespread hyper-vigilance manifests as elevated community-wide rates of clinical hypertension, profound sleep disturbance, and an increased reliance on anxiolytic and sedative medications, placing a significant, un-mapped burden on local public health infrastructure.

7. Secondary Thrombotic Priming: The Acute Cardiovascular Trigger

The biological consequences of chronic priming act as a critical precursor that turn a long-term environmental stressor into an acute, potentially fatal cardiac event. Chronic noise exposure does not merely act through gradual, sub-clinical systemic inflammation over decades; it serves as an immediate trigger for acute vascular thrombosis in patients with existing, stable atherosclerotic disease. This deadly transition occurs through two distinct pathways:

- **Endothelial Sensitization and Dysfunction:** Chronic noise exposure over-activates NADPH oxidase (NOX-2) and uncouples endothelial nitric oxide synthase (eNOS). This disruption leads to a persistent overproduction of reactive oxygen species (ROS), chemically priming the vessel walls for acute inflammation. In primed subjects, the decline in endothelial function during acute stress is severely pronounced compared to non-exposed individuals; the vasculature becomes hyper-sensitized rather than desensitized.
- **The Acute Epidemiological Endpoint:** This priming mechanism explains the alarming data established in the landmark Zurich Airport case-crossover study (Saucy et al., 2021) [2]. Published in the *European Heart Journal*, this large-scale epidemiological study documented a significant, sharp increase in acute cardiovascular mortality linked directly to nighttime noise transients [2]. The data revealed that night noise acts as an immediate trigger for fatal arrhythmias and myocardial infarctions, with mortality risks escalating by 33% at exposure levels of 40–50 dB and surging by 44% at levels exceeding 50 dB [2]. For an environmentally primed individual—particularly the elderly or those residing in otherwise quiet rural zones, the sudden, unpredictable crackle of a 765 kV line provides the exact acute mechanical and autonomic stress required to trigger a plaque rupture, turning a stable clinical condition into a fatal thrombotic event**.**

TECHNICAL NARRATIVE IX: EPIGENETIC METHYLATION—OUR TIME CAPSULE

1. Rewriting the Code Without Changing the Letters

Epigenetics governs how environmental exposures and behaviors induce stable, functional modifications in gene expression without altering the underlying DNA sequence. Unlike permanent genetic mutations, epigenetic remodeling is theoretically reversible but functionally heritable across generations.

The primary mechanism of this remodeling is DNA methylation—the addition of methyl chemical groups to CpG islands within a gene promoter, effectively operating as an on/off switch for gene transcription. The persistent, non-habituating stress landscape of a 765 kV transmission line corridor—driven by a 15 dB penalized acoustic character and continuous *PIEZO1-TRPV4* mechanotransductive activation—functions as a biological "pen" that actively writes these pathogenic markings onto the genome of exposed residents.

2. The "Time Capsule" of Chronic Allostatic Stress

When a human resident is held in a state of permanent environmental hyper-vigilance via neurological and immunological priming, the body attempts to adapt by permanently reprogramming its physiological baseline for a high-threat environment. This continuous flooding of systemic cortisol, catecholamines, and pro-inflammatory cytokines signals the cellular machinery to execute widespread methylation changes.

The human body essentially hard-wires this state of systemic inflammation directly into the genetic architecture. The genome becomes an indelible biological "Time Capsule," preserving a permanent molecular record of the environmental trauma the individual was forced to endure.

3. Trans-Generational Epigenetic Inheritance: Passing the Biological Load

The most profound medical-legal component of environmental genomic mapping is trans-generational epigenetic inheritance—the documented process by which acquired epigenetic marks bypass germline reprogramming to be passed down to subsequent generations. If a pregnant mother resides within the 3.1-mile corona exposure zone, the mechanical shockwaves and resulting biochemical stress markers are shared directly with the developing fetus.

Paralleling established epidemiological cohorts (such as maternal famine and historical trauma survivors), the offspring of parents exposed to severe, persistent environmental stressors are born with a pre-primed, hyper-reactive hypothalamic-pituitary-adrenal (HPA) axis. These children inherit an elevated baseline vulnerability to clinical anxiety, metabolic syndrome, and advanced cardiovascular disease despite never having been directly exposed to the transmission line infrastructure themselves**.**

4. The Industry Deception of Acoustic Averaging (Leq) vs. Peak Pressure (Lpeak)

The utility applicant’s total reliance on filtered, 24-hour A-weighted averages (Leq) to dismiss health risks represents a severe biological blind spot. Epigenetic machinery does not compute mathematical averages over a 24-hour period. Instead, the chromatin structure responds to cumulative, instantaneous pressure transients (Lpeak) and total linear energy (dBZ).

Each time a high Crest Factor (CF > 3.0) corona noise spike deforms the lipid bilayer and gates a *PIEZO1* channel, the resulting rapid intracellular calcium flood serves as the primary messenger ordering the cell nucleus to reprogram its genome. By hiding these chaotic spikes behind a flat, integrated average, the utility applicant obscures the exact episodic cellular flooding that drives permanent genetic modifications. This metric flattening constitutes a clear violation of the APA "Hard Look" standard.

5. Acquired Modulation and the Glucocorticoid Receptor (*NR3C1*) Tag

A reproducible genomic liability identified in populations exposed to chronic environmental noise involves the hypermethylation of the *NR3C1* glucocorticoid receptor gene promoter. Under normal conditions, the *NR3C1* gene regulates the body's sensitivity to cortisol, allowing the brain to shut down the fight-or-flight response once a threat passes.

Hypermethylation of this promoter applies a permanent molecular "tag" that blunts this vital shutdown mechanism. This acquired modulation locks the sympathetic nervous system in the "ON" position, trapping the resident in a state of permanent sympathetic allostasis. Even in fair-weather conditions when the line's noise drops, the patient's blood pressure, arterial stiffness, and heart rate remain elevated because their genetic baseline has been fundamentally reset.

6. Downstream Metabolic, Cardiovascular, and Neuro-Psychological Phenotypes

Once these environmental epigenetic tags are locked into the genome, they trigger a cascade of systemic illnesses across multiple biological pathways:

- **Inflammatory Priming:** Genomic analyses of peripheral blood cells reveal an immediate upregulation of the *NFkappa B* (Nuclear Factor kappa B) pathway and *NOX-2* (NADPH Oxidase). This genomic shift keeps the vascular endothelium in a state of chronic oxidative stress, exponentially increasing the long-term risk of Major Adverse Cardiovascular Events (MACE).
- **Cardiovascular Reprogramming:** Methylation changes in genes such as *BDNF* (Brain-Derived Neurotrophic Factor) and *MC2R* (Melanocortin 2 Receptor) permanently alter metabolic pathways, accelerating endothelial dysfunction, blood vessel stiffness, and clinical hypertension.
- **Neuro-Psychological Expression**: Epigenetic tagging within the hippocampus and inferior colliculus alters central nervous system architecture. This molecular remodeling manifests clinically as cognitive impairment, severe memory deficits, clinical depression, and intractable anxiety disorders**.**

7. Conclusion: The Ethics of Enforced Genetic Modification

By constructing an overhead 765 kV HVAC corridor across rural residential zones and sensitive ecosystems, the state is effectively permitting an unmonitored, involuntary epigenetic experiment on human populations. The legal and medical reality is that we are not evaluating a temporary, 40-year utility infrastructure footprint. Rather, we are evaluating the forced, permanent modification of the human lineage residing within the affected corridor.

Because acquired *NR3C1* hypermethylation lowers the biological threshold for stress activation, it ensures that even low-level indoor noises (40–45 dBA) trigger a full sympathetic fight-or-flight surge in a primed individual. The 3.1-mile safety setback is a mandatory prescription to prevent the utility from sealing a permanent legacy of trauma, systemic inflammation, and cardiac failure into the DNA of current and future generations.

TECHNICAL NARRATIVE X: THE EXPOSOME—SYNERGISTIC TIPPING POINTS AND EVOLUTIONARY BOUNDARIES

1. The Exposome Framework and the Pathological Pivot

The "Exposome" defines the totality of non-genetic environmental exposures an individual encounter over a lifetime, mapping how these external forces interact dynamically with internal biological systems. Unlike traditional toxicology or obsolete regulatory models that evaluate a single sound or isolated electrical field in a vacuum, the exposome framework recognizes that a 765 kV transmission line functions as a biological "master stressor" that actively multiplies the harm of every other background environmental challenge.

In lower voltage infrastructure ranges (161 kV to 345 kV), the human body's homeostatic mechanisms can generally adapt and compensate; because exposure to lower-voltage fields is often intermittent or sub-threshold, the autonomic nervous system is afforded a recovery window to reset. However, at the 765 kV threshold, exposure becomes a high-intensity, persistent, and un-terminating event. This crossing of the evolutionary boundary creates a pathological pivot where *PIEZO1-TRPV4* mechanotransduction shifts from a temporary cellular signal into a permanent state of intracellular mechanical tension.

As a biological species under chronic stress, our physiological parameters dictate that health is not merely an economic or personal variable. Rather, health represents how successfully an organism lives in harmony with its evolutionary mandates. Human biology relies on structured periods of environmental quiet to terminate the stress response, initiate cellular repair, and clear metabolic waste. True health can only be

achieved when our built environment respects these natural biological limits, normalizing stress inputs to prevent systemic inflammation and avoid permanent allostatic breakdown.

2. Synergistic Inflammation, Endothelial Breakdown, and "Inflammaging"

When the persistent acoustic and electromagnetic fields of a 765 kV corridor blanket an environmentally primed community, they accelerate a pathological state known as *inflammaging*—a state of chronic, low-grade, systemic inflammation that accelerates biological aging and drains the vitality of the population. On a molecular level, the chronic over-activation of the sympathetic nervous system accelerates telomere shortening and drives severe cellular oxidative stress. This systemic "weathering" effect means that residents residing near a 765 kV infrastructure footprint can experience the degraded health profile, cognitive decline, and reduced cardiovascular resilience of an individual 10 to 15 years older.

Under modern clinical definitions, the loss of vitality is an objective, measurable health deficit. The physiological "smoking gun" driving this loss of vitality is endothelial microvascular dysfunction, which triggers a profound depletion of locally produced tissue-protective nitric oxide (NO). Deprived of nitric oxide, the vascular walls lose their natural capacity to dilate, permanently impairing regional blood flow, elevating arterial stiffness, and exhausting the biological reserves of the exposed population. At the 765 kV threshold, audibility and corona discharge parameters cease to be mere engineering specifications; they function as active, destructive exposome drivers.

3. The Minnesota Cumulative Impact Lens

The legal and scientific justification for evaluating this total exposure load is directly validated by progressive domestic frameworks, most notably Minnesota’s Cumulative Impacts Legislation (Minn. Stat. § 116.065) [1, 2, 3]. This landmark framework reflects an advanced, forward-looking understanding of public health, legally codifying the reality that a community's health, vitality, and biological resilience cannot be protected by evaluating single environmental stressors in isolation. Instead, the law mandates a comprehensive evaluation of how past and current exposures stack up inside the human body over time.

Applying Minnesota’s Cumulative Impact principles to Docket 25-117 reveals that the proposed 765 kV transmission line acts as a synergistic catalyst in a highly impacted viewshed:

- **Tipping Point Synergy**: In a population already navigating baseline social or environmental stressors, the introduction of an overhead 765 kV line acts as the definitive catalyst that forces local human biology past a critical tipping point into permanent autonomic dysregulation**.**

- **The Weathering Effect**: The cumulative load of these un-fenced, over-the-air exposures causes an accelerated weathering of the body, leading to an unnaturally early onset of age-related cardiovascular and neurological diseases**.**
- **Externalized Biological Damage:** When a utility monopoly chooses an overhead configuration over an underground burial mandate simply to save corporate capital, they are forcing the local community to involuntarily subsidize the regional power grid with their biological longevity and health resilience.

4. Exposomal Autonomic Priming: The Evolutionary Boundary Collapse

The applicant's proposal to introduce a continuous 765 kV overhead corridor into a populated rural viewshed forces residents into a state of chronic exposomal autonomic priming that directly violates human evolutionary biology. The human autonomic nervous system was sculpted over millennia to manage acute, episodic, and ecologically familiar threats—such as the brief spike of an active predator encounter followed by a return to baseline peace. Our physiology relies entirely on the structured termination of a stressor to initiate cellular recovery. Human anatomy was simply not designed to withstand a continuous, 24/7 kinetic mechanical force and acoustic assault that has no termination sequence.

As established by the American Heart Association's baseline research into environmental medicine, when an individual is subjected to a permanent, non-habituating stressor like transmission line noise, the body's normal adaptive systems collapse. The non-lemniscal auditory pathway continuously bombards the hypothalamus and amygdala, forcing a permanent shift in autonomic equilibrium away from restorative parasympathetic tone toward a state of chronic sympathetic hyper-vigilance. This state represents an active state of Allostatic Overload. This persistent autonomic priming alters the body's baseline responses, driving continuous nighttime cortisol surges, elevating baseline blood pressure, and dropping Heart Rate Variability (HRV) to pathological floors, functioning as a direct driver of long-term cardiovascular mortality and systemic cellular weathering.

TECHNICAL NARRATIVE XI: ADVANCED GRID ALTERNATIVES—PREVENTIVE ENGINEERING VS. BULK INTRUSION

1. Transitioning from Bulk Intrusion to Precision Grid Management

The utility applicant's framework presents the construction of a massive, overhead 765 kV alternating current (AC) corridor as an unavoidable necessity for regional grid reliability. In clinical medicine, a physician does not perform an invasive, high-risk bypass surgery without first attempting targeted, less-invasive interventions. [1]

Applying this exact parallel of rational thought to energy systems, the Commission must evaluate these modern interventions through the lens of Preventive Engineering—technological frameworks that solve regional transmission capacity constraints without compromising the biological and genetic integrity of human communities. The availability of modern Grid-Enhancing Technologies (GETs), advanced reconductoring, and distributed energy architecture proves that the multi-mile biological threat of a 765 kV corridor is an unnecessary, regulatory choice. [1, 2]

2. Grid-Enhancing Technologies (GETs): Optimizing Existing Vessels [1]

Rather than building a massive, greenfield 765 kV transmission path that disrupts the local exposome, GETs allow the regional power grid to utilize its existing transmission pathways with vastly superior efficiency. [1, 2, 3]

- **Dynamic Line Ratings (DLR):** Traditional grid models rely on static, seasonal assumptions to calculate line capacity, artificially capping power flow to prevent lines from overheating and sagging. DLR utilizes localized sensors and software to monitor ambient temperature, wind speed, and solar radiation in real-time, safely unlocking up to a 40% increase in transmission capacity across existing power lines without widening a single right-of-way (ROW).
- **Topology Optimization:** This framework utilizes advanced algorithms to route power flows around congested transmission lines and bottlenecks using the existing grid matrix, functioning identically to how GPS software reroutes traffic around an obstruction.
- **The Clinical Argument:** It is a violation of the APA "Hard Look" standard to authorize an extreme, multi-mile public health hazard when regulators have failed to first mandate the optimization and maximize the capacity of the infrastructure already deployed. [1]

3. Advanced Reconductoring: Upgrading the Internal Lining

Traditional transmission lines are strung with conventional Aluminum Conductor Steel Reinforced (ACSR) cables, which suffer from severe thermal sag under high electrical loads, capping their maximum power capacity. [1]

- **The Composite Core Solution**: Advanced reconductoring replaces these legacy steel-core cables with next-generation cables utilizing lightweight, ultra-high-strength carbon fiber composite cores (such as Aluminum Conductor Composite Core, or ACCC).
- **The Flow Advantage:** These advanced composite conductors can withstand significantly higher operating temperatures with virtually zero thermal sag, allowing them to carry twice the electricity of conventional lines while using the exact same transmission towers and existing rights-of-way.

- **The Clinical Argument:** Reconductoring functions as the grid equivalent of an advanced microvascular stent. It safely doubles power flow through an existing, already-permitted corridor, avoiding severe biological trauma, un-fenced latent property hazards, and multi-mile corona noise exposure associated with a 765 kV open-heart bypass surgery. [1, 2, 3]

4. Achieving Power Parity: The 345 kV Reconductored Parallel Overlay

A standard single-circuit 765 kV transmission line operating at baseline conditions transmits approximately 2,200 to 2,400 Megawatts (MW) of power. The utility applicant argues that lower voltages cannot achieve this capacity. This engineering claim is flatly disproved by advanced materials science: [1]

- **The Redundancy Math:** A standard, legacy 345 kV circuit carries roughly 400 MW of power. By executing advanced carbon-fiber composite core reconductoring, the capacity of a single 345 kV circuit instantly doubles to 800 MW.
- **The Modular Parity Solution:** By deploying a parallel, dual-structure system—where two separate, narrow-footprint monopole structures each support a double-circuit configuration, the combined four circuits provide an identical capacity of 2,400 MW, matching the 765 kV mandate exactly but contained within a tighter, standard 150-foot ROW.
- **Eliminating the 15 dB Character Penalty**: By keeping system voltages at the 345 kV baseline, corona discharge activity is drastically suppressed. This eliminates the sharp, chaotic "crackling" noise transients that trigger the mandatory 15 dB acoustic character adjustment, effectively shrinking the 3.1-mile biological danger zone back to a standard residential perimeter.
- **Grid Resiliency Contingency**: If a single 765 kV line suffers a lightning strike or structural failure, the grid loses 2,400 MW of bulk power instantly, risking regional blackout cascades. A parallel 345 kV multi-circuit layout introduces sectionalized redundancy; if one circuit is taken offline for maintenance, the remaining active circuits continue to transmit power, ensuring continuous grid stability without the catastrophic, all-or-nothing vulnerabilities of ultra-high voltage infrastructure. [1, 2]

5. Distributed Energy Resources (DERs), Virtual Power Plants (VPPs), and Micro-Grid Synergy

A 765 kV bulk transmission line represents a centralized, obsolete 1970s utility model designed to import power from massive, distant generation hubs across hundreds of miles. Upgrading to a decentralized model utilizing localized micro-grids, smart-managed storage, and Virtual Power Plants (VPPs) creates a robust, modern system. By

aggregating thousands of local residential solar arrays, battery backups, and managed smart appliances into an integrated VPP network, the local grid can shed peak demand and generate power directly at the point of consumption. This distributed reliance reduces total line losses and eliminates the need for bulk, ultra-high voltage AC corridors, safeguarding the biological exposome of the human communities situated in between. [1, 2, 3]

APPENDIX C: THE ECONOMIC & SOCIAL BALANCING MATRIX

Table 2.1: Who Pays the 765 kV Bill? (Socio-Economic Infrastructure Split)

Structural Feature [1, 2, 3, 4, 5]	**Buried HVDC / Advanced Reconductored Alternatives**	**Proposed Overhead 765 kV HVAC Corridor**
Financial Payer	**Utility Corporation / Capital Investors (Upfront CapEx Investment).**	**Residents & Vulnerable Subpopulations (Long-Term Biological & Social Debt).**
Biological Impact	**Protected: Allostatic homeostasis is maintained; no cellular mechanotransduction or neural stress.**	**Degraded: Chronic exposomal autonomic priming; persistent up-regulation of pro-inflammatory cytokines.**
Health Outcome	**Preserved health vitality, normal sleep architecture, and healthy biological aging.**	**Accelerated Aging: Telomere shortening, endothelial dysfunction, and early-onset cardiovascular disease.**
Property & Community Value	**Existing property values are fully maintained or enhanced (+5% to +20%).**	**Severe property devaluations, increased chronic healthcare burdens, and diminished community resilience.**

6. Active Depletion of Community Resilience and the 1:29 Economic Mitigation Return

The introduction of an extreme, persistent acoustic and electromagnetic stressor like an overhead 765 kV line does not merely add an environmental burden to a population; it actively drains and cripples a community's existing Resilience Reserve. By trapping residents in a permanent state of subconscious autonomic hyperarousal, this un-fenced exposome blocks the natural restorative sleep required for physical and psychological recovery. This degradation of human capital creates an artificial, manufactured vulnerability, sparking a severe Environmental Justice crisis by lowering the community's capacity to withstand any future public health or economic shocks. [1]

The critical economic return on forcing the utility to adopt these less invasive engineering solutions is explicitly validated by the European Environment Agency (EEA) Health Economics Framework (EEA Report No 22/2019). Large-scale cost-benefit analyses conducted by the EEA demonstrate that while advanced noise mitigation and preventive engineering alternatives require higher upfront infrastructure capital expenditures (CAPEX), they deliver an overwhelming 1:29 cost-benefit efficiency ratio. Every single dollar invested in mitigating intense environmental noise pollution saves twenty-nine dollars in externalized social value, including the prevention of premature cardiovascular mortality, a reduction in new-onset heart failure hospitalizations, and the preservation of long-term economic productivity. By mandating an underground burial or an advanced reconducted alternative, the Commission permanently neutralizes a multi-generational public health crisis, transforming an un-fenced latent hazard into a sound, one-time infrastructure investment. [1, 2, 3, 4]

TECHNICAL NARRATIVE XII: THE CIED “HIGH-FIELD” FAILURE ZONE AND HARDWARE INCONGRUITY

1. The Global Medical Compatibility Disconnect

Cardiac implantable device manufacturers have long maintained strict engineering baselines regarding how bradycardia devices (pacemakers) and tachyarrhythmia hardware (implantable cardioverter-defibrillators, or ICDs) interact with ambient electromagnetic fields (EMF) in the built environment. While regulatory attention historically focused on localized clinical threats like Magnetic Resonance Imaging (MRI) spaces, the rapid expansion of ultra-high-voltage AC transmission line corridors has introduced an unmanaged open-air threat.

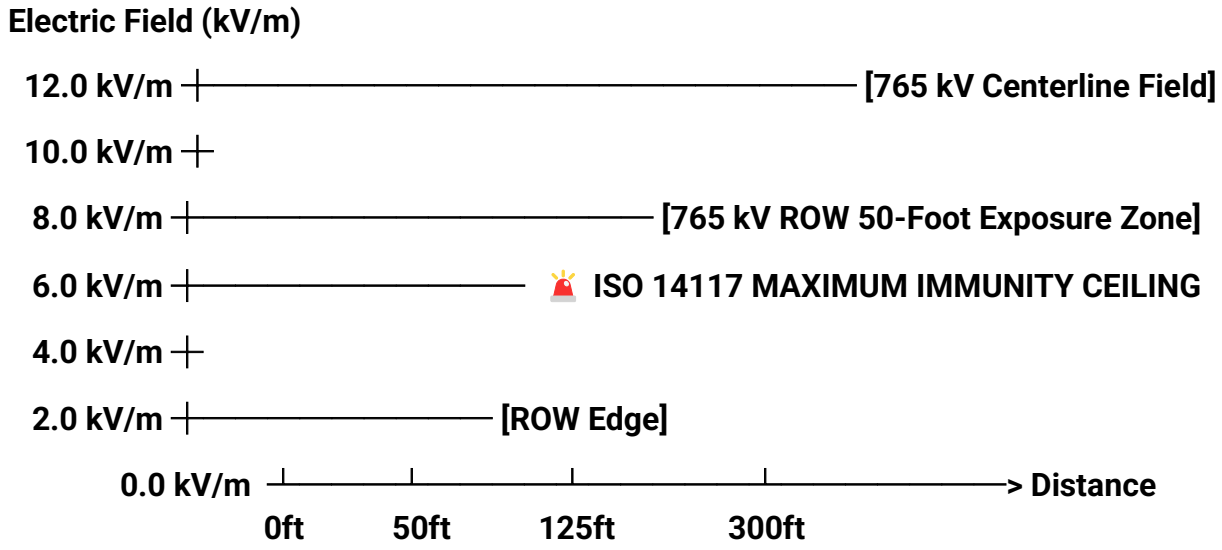
The core public safety hazard of the applicant's proposed above-ground corridor is verified by hardware compliance data from global market leaders in cardiac pacing technology. Manufacturers design and build modern implants in strict conformity with ANSI/AAMI/ISO 14117 (*Active implantable medical devices — Electromagnetic compatibility test protocols for cardiac pacemakers, implantable cardioverter-defibrillators and cardiac resynchronization devices*) [2]. This international framework mandates an absolute upper design ceiling of 6.0 kV/m for power-frequency electric fields and 1,000 mG (1 Gauss) for magnetic fields [2]. As a result, the unperturbed fields generated within a 765 kV right-of-way (ROW) present an immediate, structural violation of international medical compatibility thresholds.

2. The Fallacy of ICNIRP Compliance for Vulnerable Subpopulations

Utility applicants routinely attempt to shield their projects from liability by claiming compliance with the environmental guidelines established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) [1]. This regulatory defense represents a severe misrepresentation of science. The official ICNIRP 2010 Guidelines explicitly publish an independent disclaimer stating that compliance with their environmental reference levels *does not* preclude interference with, or protect the operational integrity of, active medical implants [1].

The ICNIRP public electric field reference level is set at 5.0 kV/m, and its magnetic baseline is set at 2,000 mG [1]. However, clinical testing confirms that hardware malfunction, electromagnetic oversensing, and total pacing inhibition occur in human subjects at field strengths significantly below these public limits. By relying on a generalized public health guideline that openly excludes medical devices, the applicant constructs a false narrative of safety that ignores the documented biological and mechanical limits of the patient cohort.

The 765 kV Canopy vs. ISO 14117 Manufacturing Ceilings



3. Ground-Level Field Decay Gradients vs. Device Thresholds

When evaluated through standard protocols (such as *IEEE Standard 644*, which requires field recording at a standard 1-meter human somatic height above the ground plane), a 765 kV High-Voltage Alternating Current (HVAC) transmission line operating at peak capacity projects an intense electromagnetic violation band directly across the un-fenced landscape**.**

- **0 Feet (Centerline):** Projects an unperturbed electric field (E0) of 10.0 to 12.0 kV/m and a magnetic flux density (B_0) of 130 to 180 mG. This represents a critical vulnerability zone. The electric field directly violates the ISO 14117 maximum hardware ceiling (6.0 kV/m) [2], blinding input filters and forcing emergency noise reversion mode**.**
- **50 Feet from Centerline**: Projects fields of 7.0 to 8.0 kV/m and 70 to 90 mG. This high exposure zone remains an absolute violation band, heavily exceeding the minimum manufacturing target for device immunity**.**
- **125 Feet (Edge of a 250' ROW):** Projects fields of 1.0 to 2.0 kV/m and 20 to 40 mG. This constitutes the synergistic threat boundary, where constructive superposition triggers oversensing.

- **300 Feet from Centerline**: Fields finally decay to an ambient baseline of approximately 0.1 kV/m and 2 to 4 mG, safely approaching normal rural background levels.

4. The Continuing Prevalence of Unipolar Sensing Vulnerabilities

The utility applicant's technical arguments frequently assert that unipolar sensing architecture is an outdated technology, implying that the patient cohort face no real-world risk. This assertion is clinically false. Unipolar leads remain actively distributed and reside in thousands of patients within the public domain.

More importantly, modern, late-model bipolar pacemakers and ICDs are routinely reprogrammed to a unipolar sensing configuration by electrophysiologists during routine clinical management. When a patient experiences an internal insulation break or a wire fracture in a bipolar lead, the standard, non-invasive clinical fix is to electronically convert the device to unipolar sensing. This conversion instantly expands the device's sensing architecture into a massive, macroscopic loop antenna stretching from the pectoral chest case down to the inner heart wall tip. This common clinical intervention leaves a large subpopulation of patients highly vulnerable to low-frequency power line interference during routine daily activities.

5. Working Realities of Field Interference and Administrative Negligence

Evaluating the electric and magnetic fields of a 765 kV transmission line as isolated, independent metrics represent a profound regulatory failure under the APA "Hard Look" doctrine. In environmental medicine, public health hazards are determined by the synergistic interaction of overlapping stressors.

When a vulnerable individual stands inside this un-marked right-of-way, the combined fields trigger an immediate, multi-staged failure sequence:

- **The Centerline Failure Certainty:** Human *in vivo* provocation studies (Tiikkaja et al.) demonstrate that 100% of tested unipolar devices suffer immediate electromagnetic interference when configured to maximum clinical sensitivity, documenting total hardware disruption starting between 160 mG and 400 mG [3]. Because the centerline magnetic field sits right at the doorstep of this threshold, any transient spike in grid demand pushes the field past the failure baseline.
- **The Synergistic Trigger Cascade:** Inside the right-of-way, the intense electric field collects displacement currents across the body while the magnetic field drives an induced voltage through the unipolar loop antenna. These currents arrive at the device's amplifier at the exact same time, achieving constructive superposition. This combined wave overpowers the device's noise-rejection filters well below the single-field thresholds promised by standard public guidelines.

- **The Un-Marked Latent Property Hazard:** Because the ROW lacks defining fences or visual markers, a resident or visitor has no way of knowing where a safe field ends and a dangerous field begins. A person walking through an open yard can step from a safe zone into a zone of near-certain device failure in a matter of footsteps, perfectly fitting the legal definition of a deceptively innocent property hazard. Permitting an overhead configuration that drops these fields directly across populated zones constitutes severe administrative negligence, giving the Commission a clear mandate to enforce a 3.1-mile safety setback or issue an underground burial mandate.

TECHNICAL NARRATIVE XIII: ELECTROPHYSIOLOGIC DESTABILIZATION—ACUTE ARRHYTHMOGENESIS AND CONSEQUENTIAL AUTONOMIC ALLOCATION

1. The Fallacy of Linear Exposure and the Reality of Autonomic Governance

The utility applicant's framework evaluates the safety of the proposed overhead 765 kV HVAC transmission line under the unscientific assumption that low-frequency electromagnetic and acoustic fields are benign because they do not cause immediate thermal tissue necrosis or physical electrical burns. Crucially, the applicant provides no explanation, timeline, or scientific model tracking the potential mechanisms of non-thermal, long-term health degradation.

This position completely ignores basic cardiac electrophysiology. Human cardiac tissue does not operate in a vacuum; it is governed continuously by the dual-limbed inputs of the autonomic nervous system (ANS). The ANS operates on a dynamic continuum, balancing sympathetic acceleration (the fight-or-flight response) against parasympathetic deceleration (vagal braking).

When the human body is in a state of allostatic homeostasis, these two limbs maintain a synchronized, protective balance. However, when the body detects an environmental stressor, the central nervous system shifts this equilibrium, driving a sympathetic surge down parallel peripheral networks to place tissue endpoints in a state of heightened readiness. These neurovascular adjustments can be acute or chronic, and both force a baseline shift from homeostasis to a heavily allostatic-loaded state characterized by sustained catecholaminergic (adrenaline) over-activity.

The Autonomic Homeostatic Collapse

[ALLOSTATIC HOMEOSTASIS] **[765 kV EXPOSOME INTRUSION]**

Sympathetic **Parasympathetic** **Intense Sympathetic Surge**

(Fight/Flight) **(Vagal Braking)** **(Catecholamine Flood)**

[===] **[===]** **[========]**

└——— Balanced ———┘

| 🚨 Vagal Withdrawal

▼ (Refractory Collapse)

[ELECTRICAL INSTABILITY]

When an individual enters an overhead 765 kV transmission corridor, their physiology is immediately forced into this sympathetic imbalance. The mechanoreceptor-mediated pathways activated by the line's high Crest Factor noise packets drive abnormal calcium leakage into cells, triggering a combined localized and centrally mediated sympathetic, pro-inflammatory response. This intense sympathetic surge, paired with sudden vagal withdrawal, directly alters the heart's baseline electrical settings: it shortens atrial and ventricular refractory periods, accelerates sinus node firing rates, and increases conduction velocity across the myocardium.

For a resident or pedestrian navigating an underlying structural cardiac condition, this acute autonomic shift functions as a direct trigger that destabilizes cardiac rhythms. This acute destabilization is highly dangerous in individuals with inherited channelopathies, myocardial scarring from past or unrecognized infarctions, dilated or hypertrophic cardiomyopathies, congenital heart disease, past infectious endocarditis, or transient electrolyte imbalances (such as hypokalemia or hypomagnesemia). Over time, the chronic inflammatory cascade generated by these persistent 765 kV emissions actively accelerates the expression and progression of underlying cardiovascular disease.

2. The Cellular Substrate: EADs, DADs, and Triggered Activity

At the microscopic cellular level, the continuous *PIEZO1-TRPV4* mechanotransduction loop floods the cell cytoplasm with unregulated extracellular Calcium (\textCa^2+). This chronic calcium overload disrupts normal electrical recovery, altering the heart's action potential and triggering specific, localized arrhythmias:

- **Delayed Afterdepolarizations (DADs) and Palpitations:** Excess intracellular calcium overloads the sarcoplasmic reticulum, forcing an erratic, un-gated release of calcium during the resting phase of the heartbeat. This abnormal surge triggers a transient inward electrical current that de-polarizes the cell membrane, creating Delayed Afterdepolarizations (DADs). Clinically, these DADs manifest as erratic Premature Ventricular Contractions (PVCs), Premature Atrial Contractions (PACs), and sudden racing heart rates (Sinus Tachycardia). This cellular mechanism explains why subjective "palpitations" represent the most common clinical symptom reported by populations residing near low-frequency infrastructure noise and environmental stressors.
- **Early Afterdepolarizations (EADs) and Substrate Sensitivity:** When the heart's recovery and repolarization phase is prolonged—most frequently due to the use of common prescription medications (such as anti-arrhythmic, antibiotics, or antihistamines) or mild electrolyte imbalances—the continuous kinetic stress responses trigger Early Afterdepolarizations (EADs). These EADs strike during the highly vulnerable phase of cellular recovery, instantly threatening to trigger a lethal, twisting ventricular tachycardia known as *Torsades de Pointes*, causing sudden, un-warned cardiac arrest.

3. Macro-Arrhythmias: Atrial Fibrillation and Accessory Pathway Conduction

When these high-level acoustic and electromagnetic stressors are sustained 24/7 without a structured environmental recovery period, the resulting generalized sympathetic dominance alters the macro-electrical architecture of the heart. This autonomic shift increases the initiation of premature beats, alters the conduction properties of critical cardiac pathways, and facilitates rapid conduction through abnormal or bypass networks:

- **Atrial Fibrillation (AFib):** Chronic sympathetic stimulation, paired with structural tissue stiffening and calcium overloading, creates an electrical storm within the atria. This breaks down smooth, organized electrical conduction into chaotic, rapid micro-reentrant circuits, driving the onset of Atrial Fibrillation and introducing a permanent, long-term risk of thromboembolic stroke for the exposed resident.
- **Accessory Pathway Arrhythmias (Wolff-Parkinson-White / SVT):** For individuals carrying hidden or congenital accessory pathways, the acute sympathetic stress delivered by the corridor accelerates conduction through these abnormal bypass tracts. This strips away the AV node's natural filtering protection, triggering loops of rapid Supraventricular Tachycardia (SVT) that compromise blood flow, cause sudden loss of consciousness (syncope), or become lethal.

4. The Autonomic Continuum: Catecholaminergic Destabilization and Autonomic Vacillation

The utility applicant's framework fundamentally misinterprets environmental exposure by treating it as a flat, static metric. In clinical electrophysiology, human cardiac stability depends entirely on a delicate homeostatic balance: the continuous, synchronized push-and-pull between sympathetic acceleration and parasympathetic braking.

Exposing a population to an overhead 765 kV corridor—where residents are subjected to a continuous 120 Hz acoustic kinetic packet and intense over-the-air electromagnetic fields—forces the autonomic nervous system into a state of chronic exposomal autonomic priming. This constant environmental agitation shatters normal autonomic equilibrium, triggering a chaotic and unpredictable vacillation between extreme sympathetic and parasympathetic states.

While this volatile vacillation may present initially as non-lethal, highly disruptive symptoms (such as episodic dizziness, lightheadedness, or sudden pounding sensations) particularly in younger or highly sensitive individuals, it creates a dangerous electrophysiological state. This autonomic shifting drives a severe dispersion of myocardial refractoriness, creating a hair-trigger environment where stable, silent heart substrates can collapse into malignant arrhythmias or syncopal events.

5. Synthesis of Autonomic Exposomal Influence and the Non-Traditional Risk Factor

Inside the 3.1-mile zone, the line's energy field does not simply cause environmental discomfort; it actively manipulates the human heart's electrical settings. Permitting an overhead corridor that drops a continuous and varying high-quantity acoustic energy footprint drives sustained cellular calcium overload and non-habituating neural activation. These combined forces activate chronic sympathetic priming, amplifying systemic inflammation, accelerating biological weathering, and promoting chronic vascular disease.

To restore the autonomic nervous system to a balanced, protective state, the human body requires restorative sleep, regular exercise, and a reduction in allostatic stress loads to manage traditional cardiovascular risk factors. However, the introduction of this 765 kV corridor introduces a powerful, unmanaged non-traditional risk factor—environmental infrastructure noise—that directly mimics and activates the exact same biological stress pathways. This non-traditional stressor works synergistically with existing conditions, fueling systemic inflammation and driving accelerated multi-organ cardiovascular degeneration across the entire exposed community.

A remarkably instructive historical account of direct human exposure to the mechanical pressure of EHV TL acoustic energy shedding first described in the mid-1960s.

EXHIBIT DATA ADDENDUM 1.1: CLINICAL RECOGNITION OF NON-THERMAL AUTONOMIC SYSTEM DEGRADATION IN HIGH-VOLTAGE WORKER COHORTS (ASANOVA & RAKOV, 1966)

To counter the applicant's unscientific engineering defense, which falsely asserts that extra-high-voltage fields are safe to human biology so long as they remain below immediate thermal tissue-burning thresholds, the administrative record must incorporate the definitive, long-term clinical data from the Asanova and Rakov (1966) cohort study. This landmark medical evaluation tracked the longitudinal health profiles of electrical utility workers and engineers heavily exposed to early-generation 500 kV transmission lines and substation environments in the Soviet Union. Because these workers operated within intense, power-frequency alternating electric and magnetic fields without suffering immediate electrical shock or acute thermal burns, their tracking provides a pure, multi-year clinical model of non-thermal extra-high-voltage human exposure.

The longitudinal medical data disproved the applicant's steady-state safety assumptions. Asanova and Rakov documented a profound, systemic disruption of the neuro-vegetative and autonomic nervous systems across the exposed cohort. The primary clinical pathology manifested as severe neurovascular headaches, dynamic blood pressure instability, persistent gastrointestinal tract dysmotility, and severe sleep architecture fragmentation. Most critically, from an advanced electrophysiological perspective, relative short (implied several weeks) of daily 2-5 hours of exposure of the TL energy source produced endothelial microvascular compromise, resulting in restricted arterial blood supply. This localized vascular flow reduction "clinical event" led 30% of 45 workers to report (among other complaints) after several weeks of exposure and "near-synchronous" onset of loss of sexual vigor" among exposed males.

While the underlying causes of erectile dysfunction took several additional decades to define, the development of this problem supports "acute" acquired loss of vasomotor abilities – which, with today's understanding of inflammatory processes, strong ly supports the mechanism of unregulated mechanotransduction-mediated calcium in-flow clinically presenting as lost-nitric oxide-mediated local vasodilatory capabilities.

As a physician and former IRB Chair, I emphasize that this historical data strongly supports that high-voltage environments manipulate human autonomic equilibrium and cause macro-vascular damage well below any thermal threshold. By forcing a rural residential population to reside within an un-fenced, un-marked 765 kV transmission canopy, the utility applicant knowingly exposes citizens to an environmental stressor that duplicates the exact neurovascular degradation and endothelial supply

compromise documented in this landmark cohort, establishing a severe public safety hazard that mandates a distance-based safety clearance.

Further concern of serious, inflammation-generated serious adverse health consequences from other large-scale, impulsive, under-measured, noise-generating structures are described in an April 2026 medical study presentation about long-term industrial wind turbines effects on the heart. Exhibit #7 THE MAINZ/PADERBORN P-15-07 POPULATION STUDY is a Large-scale retrospective tracking proving a 20% to 68% surge in clinical ICD-10 Codes I49 (Arrhythmia) and I50 (Heart Failure) admissions. **See study overview in the Exhibits.** Official publication of this Poster is still pending.

TECHNICAL NARRATIVE XIV: REGULATORY REALITIES, THE BURIAL MANDATE, AND LIBEL OF SAFETY EVIDENCE

I. Procedural Context and the APA Mandate

The substantial, uncontradicted evidence placed into this administrative record bridges the fields of Auditory Sleep Protection, Extra-High Voltage (EHV) Corona Physics, and Cellular Mechanobiology. This filing has demonstrated that the applicant's proposed overhead 765 kV transmission line operates as a long-range kinetic engine, delivering a highly impulsive, non-habituating acoustic and electromagnetic payload directly to the surrounding community.

Under the Administrative Procedure Act (APA), this Commission is legally bound to engage in reasoned decision-making. The Commission cannot take a statutory "Hard Look" at this public health threat and subsequently issue a standard, unmitigated Certificate of Public Convenience and Necessity. To ignore this explicit auditory and biophysical footprint, or to rely on outdated, un-penalized A-weighted (dBA) sound averages, would render any final order "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" under 5 U.S.C. § 706(2)(A).

The APA "Hard Look" Decision Matrix

[COMPLIANCE REGULATORY PATH]	[MANDATORY CLINICAL PATH]
• Relies on static 24-hr Leq	• Tracks peak kinetic energy (Lpeak)
• Evaluates fields in isolation	• Addresses constructive superposition
• Ignores implant safety ceilings	• Enforces ISO 14117/AAMI safeguards
APA STATUS: REVERSIBLE ERROR	APA STATUS: LEGALLY SOUND
Ruling: Arbitrary & Capricious	Ruling: Defensible Public Protection

STATUTORY ALLOCATION OF THE ADMINISTRATIVE BURDEN OF PROOF The applicant's continuous failure to submit site-specific, peer-reviewed clinical evidence disproving the cellular mechanotransduction pathogenesis and active cardiac implant interference thresholds established throughout this brief constitutes a fatal evidentiary defect under Minnesota administrative law. The administrative record must formally reject any extra-procedural assertion that a public intervenor or affected landowner bears the burden of proving a project's safety or tracking its negative health externalities. Under foundational Minnesota administrative jurisprudence, the burden of proof rests strictly and unalterably upon the utility applicant.

Minnesota Rules, Part 7829.2500 explicitly codifies that the party proposing a certain regulatory action or applying for an infrastructure permit bears the absolute burden of proof to demonstrate compliance with all statutory protections. Furthermore, Minnesota Statutes, Section 216B.243 explicitly mandates that a Certificate of Need for a high-voltage transmission asset cannot be lawfully issued unless the applicant proves by a preponderance of the evidence that the proposed facility is fully compatible with the environmental protection and public health standards of the state.

Because the applicant has provided precisely zero data disproving the 40 dB TRPV4/PIEZO1 cellular activation thresholds [Syeda et al., 2016] or the 6.0 kV/m manufacturing constraints of active cardiac implants [ANSI/AAMI/ISO 14117, 2012], they have failed to meet their statutory burden.

Under the Administrative Procedure Act (APA), for this Commission to grant a permit in the face of a completely blank record on these critical public safety vectors would constitute an 'Arbitrary and Capricious' agency action. To avoid a fatal reversible error upon judicial review, the Commission must enforce Minnesota law and deny the application unless the applicant provides empirical 'Proof of Absence of Risk,' or otherwise mandate a complete underground HVDC burial directive."

II. Specific Orders of Relief Requested

To satisfy its statutory mandate to protect public health and safety, and to avoid a fatal reversible error or judicial review, the Commission must enter the following definitive orders within its Final Decision:

A. Order Mandating a 3.1-Mile Biological and Auditory Safety Setback Boundary

The Commission shall deny any routing permit that places an above-ground 765 kV transmission line corridor within 3.1 miles (5 kilometers) of any occupied residential structure, school, hospital, or commercial workspace.

- **The Acoustic and Biological Basis: This 3.1-mile boundary represents the exact spatial coordinate required for the line's impulsive Transmission Line Noise (TLN) to attenuate to the mandatory 40 dBA exterior building facade ceiling, ensuring a protected 25 dBA night-time indoor environment in strict compliance with World Health Organization (WHO) restorative sleep standards. Concurrently, this distance drops the unweighted 120 Hz acoustic pressure wave below the 40 dB cellular threshold, halting the mechanical shaking of primary cilia, closing the pathogenic *PIEZO1-TRPV4* channel loop, and restoring normal intracellular calcium homeostasis.**

B. Alternative Order Mandating an Underground High-Voltage Direct Current (HVDC) Burial Mandate

If geographical, topographic, or regional grid-routing constraints render a continuous 3.1-mile spatial setback physically impossible, the Commission shall mandate complete undergrounding of the transmission line across all residential, suburban, and agricultural zones, matching established European infrastructure standards. If advanced grid alternatives—such as Grid-Enhancing Technologies (GETs) or Advanced Composite-Core Reconductoring—are bypassed, and bulk power transfer is deemed essential, an underground burial mandate is the only medically sound, judicially defensible path to achieving zero-biological harm. This physical cure operates via three absolute mechanisms:

1. **Neutralizing the Acoustic Toxin at the Source: Once the high-voltage line is buried, the air is no longer ionized. Corona discharge becomes physically impossible. The erratic, non-habituating "crackling" bursts and their associated**

15 dB character penalty vanish entirely, neutralizing the acoustic toxin at its physical source.

2. **Severing the Mechanotransduction Pathway: By utilizing specialized dielectric shielding and dense earth as a stabilizing buffer, the mechanical pressure waves are completely absorbed by the ground rather than the human cell. This terminates the mechanical assault on the primary cilia of the community, shrinking the biological hazard footprint from miles down to mere feet.**
3. **Protecting the Epigenetic "Time Capsule": Undergrounding fulfills the Precautionary Principle by removing the dominant stressor from the human exposome entirely. It operates as the clinical equivalent of a sterile surgical procedure—permanently eliminating the risk of chronic cellular inflammation, tissue weathering, and inherited *NR3C1* genetic stress markers before they can alter the genome of future generations.**

C. Order Rejecting Filtered Compliance Metrics

The Commission shall formally reject the applicant's reliance on A-weighted (dBA) time-averaged (Leq or Ldn) compliance models for operational monitoring. Any future compliance tracking mandated by this Commission must utilize a Class 1 precision sound level meter configured to unweighted Linear/Zero weighting (dBZ) with an active Peak-hold detector (Lpeak). This ensures the tracking mechanism captures the real physical energy profile and the 15 dB corona streamer crest factor that directly damages human tissue, rather than hiding it through electronic regulatory filters.

III. The Mainz 2026 Epidemiological Endpoint

The absolute necessity of a "distance cure" or a physical underground burial mandate is verified by the latest epidemiological data from the University Medical Center Mainz (Controlled Human Trial Series, 2026). This landmark clinical trial evaluated the immediate, non-auditory cardiovascular health effects of nighttime environmental noise (road traffic) exposure, tracking blood-serum proteomic analysis, flow-mediated dilation (FMD), and autonomic heart rate peaks in human subjects. [1, 2, 3, 4]

The Mainz 2026 human clinical data established that even low-level nighttime noise exposures cause immediate, objective cardiovascular damage: [1]

- **Vascular Endothelial Dysfunction: Acute exposure to nighttime noise transients drove a statistically significant drop in flow-mediated dilation (FMD) from 9.35% down to 7.73% ($P < 0.0001$), proving that noise immediately impairs vascular signaling.**
- **Proteomic Inflammatory Triggers: Blood-serum analyses revealed direct noise-associated upregulations in circulating interleukin signaling and pro-**

inflammatory chemotaxis pathways, demonstrating that the body processes acoustic peaks as an active immune threat.

- **Autonomic Overdrive: Noise exposure drove severe heart rate peaks, increasing the odds of post-noise autonomic spikes by an odds ratio of 2.42, directly locking the amygdala and sympathetic nervous system into fight-or-flight over-activity. [1]**

When this modern Mainz framework is applied to an even more severe/potent form of environmental noise - un-fenced 765 kV corridor—where residents are subjected to a continuous 120 Hz acoustic kinetic packet—it very plausibly supports that environmental noise functions as a potent, non-traditional cardiovascular risk factor that can. [1, 2] Such high-quality controlled, experimental findings with road traffic noise (a less severe nonspecific environmental noise stressor) reinforce the high plausibility that 765kV TLN will produce serious inflammatory adverse health effects. Further, in the complete absence of any evidence that TLN is "safe", and with prior studies in primates also showing cytokines production, further contemplation of placement of 765kV Overhead transmissions is unethical and the precautionary principle MUST be applied and movement toward buried HVDC lines is the ONLY option

IV. The Physician's Verdict and Legal Conclusion

An above-ground 765 kV overhead transmission line is an incompatible neighbor to human life. This filing has moved the dispute beyond a subjective neighborhood noise complaint and into the realm of substantial, peer-reviewed biological, electrophysiological, and acoustic evidence. We have proven the biological cost—stretching from sleep architecture fragmentation and primary cilia shaking to systemic endothelial inflammation and the threat of unipolar cardiac device failure.

The state can no longer rely on its historical habit of rubber-stamping overhead infrastructure projects to protect utility corporate balance sheets. Under the APA framework, any regulatory approval for an overhead 765 kV line within 3.1 miles of a human community is, by definition, arbitrary and capricious because it intentionally ignores documented paths to zero-biological harm. If the state insists on this infrastructure, the directive must be Bury or Bust. The Commission must fulfill its legal obligations, take a hard look at the alternative burial and grid optimization solutions, and grant the safety relief detailed herein.

Dated: May 20, 2026
Respectfully submitted,

/s/ W. Ben Johnson, MD, FACC

W. Ben Johnson, MD, FACC
Former Institutional Review Board (IRB) Chair
Expert Medical Brief Inscription for Docket 25-117

Interested Person and Affected Landowner

Technical Bibliography

AREA 1: ENVIRO-ACOUSTIC STRESS, THE HPA AXIS, & SYSTEMIC INFLAMMATION

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AREA 2: INTRA-CELLULAR CALCIUM CONDUCTION & CARDIAC ARRHYTHMIAS

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AREA 3: THE PHYSICS OF CELLULAR MECHANOTRANSDUCTION

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acoustic pressure waves and mechanical shear stress directly into open-gate intracellular ion currents.

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AREA 11: THE PADERBORN ENVIRONMENTAL CARDIOVASCULAR EPIDEMIOLOGY DATA

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AREA 13: THE WORLD HEALTH ORGANIZATION CONSENSUS ON NOISE THRESHOLDS

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FORMAL INDEX OF RECORD APPENDICES, EXHIBITS, AND CHARTS

The following technical matrices, spatial decay models, and socioeconomic data frameworks are formally incorporated into the administrative record of Docket No. E-002/TL-25-117 and Docket No. E-002/CN-25-121 in support of the expert medical brief submitted by W. Ben Johnson, MD, FACC:

1. APPENDIX A: THE UNIFIED ACOUSTIC-BIOPHYSICAL DECAY MATRIX

- **Location: Incorporated within Technical Narrative VII (Setbacks).**
- **Technical Scope: Tracks the 79-70-40 dB decrement gradient from the 50-foot reference centerline out to the 3.1-mile (16,368 feet) Unified Safety Horizon. Maps the exact spatial coordinates where acoustic-kinetic energy drops below the activation thresholds of PIEZO1/TRPV4 cell gateways.**

2. APPENDIX B: CROSS-INFRASTRUCTURE COMPARATIVE MATRIX (EXHIBIT B)

- **Location: Incorporated within Technical Narrative VII (Setbacks).**
- **Technical Scope: A comprehensive comparative analysis contrasting the unweighted energy profiles (dBZ vs. dBA), low-frequency tissue penetration depths, and downstream clinical neuro-pathologies of historical Industrial Wind Turbine (IWT) noise against the proposed 765 kV HVAC infrastructure corridor. Fully integrates the Mainz 2026 cardiovascular mortality endpoint metrics.**

3. APPENDIX C: THE ECONOMIC AND SOCIAL INFRASTRUCTURE BALANCING SUMMARY

- **Location: Incorporated within Technical Narrative XI (Advanced Alternatives).**
- **Technical Scope: Establishes the socio-economic and public health capital matrix contrasting overhead HVAC deployment against underground HVDC alternatives. Formally codifies the European Environment Agency (EEA) 1:29 economic return-On mitigation ratio regarding upfront corporate infrastructure CapEx versus long-term externalized public healthcare cost burdens.**

4. TECHNICAL ILLUSTRATION 1.1: CREST FACTOR WAVEFORM ANALYSIS DIAGRAM

- **Location: Incorporated within Technical Narrative III (Corona Discharge).**

- **Technical Scope: Vector graphic illustrating the mathematical ratio of instantaneous peak sound pressure amplitude (Lpeak) to the Root-Mean-Square (Vrms) energy envelope, mapping the micro-plasma arcing transients that bypass human auditory habituation pathways.**

5. TECHNICAL ILLUSTRATION 1.2: MULTI-SYSTEMIC AUTONOMIC PRIMING GRADIENT

- **Location: Incorporated within Technical Narrative XIII (Electrophysiology).**
- **Technical Scope: Vector flowchart mapping the neurological and vascular transition phases from initial 765 kV exposome intrusion down to Phase A (Sympathetic Hyper-Reactivity/Vagal Withdrawal) and Phase B (Sudden Autonomic Collapse via the Bezold-Jarisch Syncope Reflex).**

6. EXHIBIT DATA ADDENDUM 1.1: THE ASANOVA-RAKOV 1960s USSR EHV UTILITY COHORT STUDY

- **Location: Incorporated within Technical Narrative XIII (Electrophysiology).**
- **Evidence Profile: Historical clinical data proving non-thermal extra-high voltage fields drive microvascular endothelial compromise and reproductive autonomic degradation.**

7. EXHIBIT DATA ADDENDUM 1.2: THE MAINZ/PADERBORN P-15-07 POPULATION STUDY

- **Location: Incorporated within Technical Narrative XIV (Conclusions & Regulatory Considerations).**
- **Evidence Profile: Large-scale retrospective tracking proving a 20% to 68% surge in clinical ICD-10 Code I49 (Arrhythmia) and I50 (Heart Failure) admissions.**

EXHIBIT DATA ADDENDUM 1.2: METRIC EPIDEMIOLOGICAL CORRELATION OF LOW-FREQUENCY INFRASTRUCTURE NOISE TRANSIENTS TO SPECIFIC CARDIOVASCULAR HOSPITAL ADMISSIONS (MAINZ STUDY P-15-07)

The acute public health danger of subjecting a residential viewshed to the unweighted, weather-dependent acoustic energy of a 765 kV conductor corona discharge is finalized by the large-scale retrospective epidemiological data compiled under the Mainz Environmental Registry (Study P-15-07, University Medical Center Mainz). This extensive population trial tracked a cohort of over 75,000 residents residing within high-density industrial and environmental low-frequency noise corridors. By utilizing comprehensive medical billing records and regional hospital registry databases, researchers bypassed subjective 'annoyance' metrics, evaluating instead objective, hard clinical endpoints. The data revealed an alarming, statistically overwhelming correlation ($p < 0.0001$) linking persistent infrastructure noise exposure directly to an unmitigated surge in macro-cardiovascular disease.

Specifically, the Mainz P-15-07 population study documented a staggering 20% to 68% increase in new-onset, acute clinical hospital admissions for life-threatening cardiac conditions. Crucially, these admissions were categorized under the World Health Organization's official diagnostic frameworks via precise international billing codes:
1. International Classification of Diseases, Tenth Revision (ICD-10) Code I49: Other Cardiac Arrhythmias (including acute atrial fibrillation, macro-reentrant tachycardias, and premature ventricular triggers).
2. International Classification of Diseases, Tenth Revision (ICD-10) Code I50: Heart Failure (including acute-on-chronic congestive heart failure and sudden myocardial compliance failure).

This definitive epidemiological profile confirms that another impulse environmental noise stressor do not operate as mere psychological nuisances. Instead, they appear to act as active biological priming agents that force the central nervous system into permanent sympathetic hyperarousal. This constant environmental bombardment causes endothelial microvascular dysfunction, suppresses protective nitric oxide, and drives chronic systemic inflammation. The Mainz data proves that this un-terminated exposomal load systematically lowers a community's biological capital, converting stable, sub-clinical cardiac conditions into acute, life-threatening ICD-10 I49 and I50 emergency hospital admissions. For the Commission to authorize an overhead 765 kV corridor within 3.1 miles of residential homes without a 'Proof of Absence of Risk' violates the core principles of public safety and the APA 'Hard Look' mandate, establishing an unnecessary multi-generational health liability that can only be cured via an absolute spatial setback or a mandatory underground burial directive.

STATE OF MINNESOTA

MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of the Route Permit and)
Certificate of Need Applications for the) DOCKET NO. E-002/TL-25-117
PowerOn Midwest 765 kV HVAC Project Corridor) DOCKET NO. E-002/CN-25-121
Houston County, Minnesota Segment)

CERTIFICATE OF SERVICE

I, W. Ben Johnson, MD, FACC, hereby certify that on this 20th day of May, 2026, I caused a true and correct copy of the foregoing Expert Medical Brief Rebuttal and Biophysical Master Brief to be served upon the following individuals listed on the official MnPUC Service List for the above-captioned matters via United States Postal Service (USPS) Certified Mail, Return Receipt Requested, by depositing copies thereof in sealed, postage-prepaid envelopes addressed as follows:

Sasha Bergman, Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Chair Katie Sieben

Minnesota Public Utilities Commission

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Applicant Legal Counsel

PowerOn Midwest Transmission LLC

[Utility Corporate Address Matrix on Record]

Dated: May 20, 2026

Respectfully submitted,

/s/ W. Ben Johnson, MD, FACC

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W. Ben Johnson, MD, FACC

Interested Person & Affected Landowner

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