THE LAW OF NONCOMBATANT IMMUNITY AND THE TARGETING OF NATIONAL ELECTRICAL POWER SYSTEMS

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> Taken together, the synergistic effect of losing primary electrical power sources in the first days of the war helped reduce Iraq's ability to respond to Coalition attacks.[1]

The aerial bombardment of national electric power systems has long been considered indispensable to an effective wartime campaign. From as long ago as World War I to as recently as the Persian Gulf War, military planners have focused on the neutralization or destruction of enemy power grids as a critical target set and the key to vital strategic centers of gravity. Specifically, proponents assert that attacking electricity results in particularly damaging "second-order" impacts on civilian morale, political leadership, military forces and materiel production.[2]

This concept has been championed by Col. John A. Warden, USAF (ret.), who developed the theory of the "Five Strategic Rings" through his writings and discussions within the Pentagon staff.[3] The theory builds a framework for the use of aerospace power. Each ring represents a different facet of a nation's society: political leadership, economic systems, supporting infrastructure, population and military forces. Colonel Warden's innovation lays the foundation for the notion of targeting national infrastructure to attack the enemy from the "inside out, using airpower to skip over military forces, such as armies in the field, to strike directly at state leadership."[4] Although the theory has been touted by many as the aerospace strategy most appropriate for twenty-first-

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century warfare, the unspoken-but-known-result is the indirect targeting of the civilian population, euphemistically referred to as 'popular support.' There lies the essence of a raging controversy and the focus of this work: the age-old debate of military necessity versus appropriate discrimination among targets and the proportionality of the attack.

From the warfighter's perspective, the military advantage gained by targeting national electric power systems justifies the incidental civilian casualties. Critics argue that the negative humanitarian impact significantly outweighs the military benefit. They contend that the military's focus on direct harm to noncombatants is an outmoded calculation for collateral damage in this age of increased weapons lethality and this technology's catastrophic reverberative effects on civilian life-support systems.

The first section of this essay examines the value of targeting electrical systems and their vulnerabilities, and whether there is evidence to support the theory. The second section contrasts the military's argument that attacking the enemy's electric power grid is a necessity with critics' claims of disproportional humanitarian destruction. The third section assesses the resurgence of *jus ad bellum* and its impact on *jus in bello*.[5] The devastation suffered by Iraq as a result of systematic targeting of its national electric power system is the best evidence, in the modern era, of the enormous destructive impact that aerial attacks can have on noncombatants. Thus, Coalition practice during the 1991 Persian Gulf War will be offered to illustrate the debate.

The Target: Value and Vulnerability

Historically, electric power production has been viewed as a critical target in every war since the early German Zeppelin raids on England during World War I. The presumed value of the power grid as a target and its vulnerability are at the core of this traditional military orthodoxy. Those who advocate attacking the national power system assert that its inherent vulnerabilities make it an ideal target for the application of aerospace power. They assign value to this strategy based on the presumption that destroying electric power will have decisive strategic effects throughout the Five Rings of society. Critics, submitting the experiences of World War II and the Korean and Vietnam Wars as positive evidence, say that the argument about targeting the enemy's power grid is fundamentally flawed and unsubstantiated.[6]

National electric power systems differ in design and complexity. Nonetheless, they have certain basic structural components and technical aspects in common. An explanation of their operations provides an understanding of how the military perceives electric power systems to be both valuable and vulnerable.

National Power Systems

A generic electric power system is composed of four basic subsystems: generation, control, transmission and distribution.[7] An electric system is built around the generation subsystem, comprising turbines and generators. Steam,

hydro, thermal or nuclear sources provide sufficient force to turn the blades of a turbine, which causes the associated generator to rotate, producing bulk electricity.[8] The building that houses the power plant is typically the primary target of a belligerent seeking to interrupt the electrical power of an adversary. Destruction of the generation subsystem cripples electrical power at the source because the delicately machined blades and sensitive generators are extremely susceptible to damage from air attack. Furthermore, replacement components are not usually readily available due to prohibitive capital costs, so destruction of the turbine and generator results in long-term power loss.[9]

Control subsystems—effectively the brains of the national electric grid—coordinate the interconnectivity of the generating facilities to manage emergency power transfer and enhance reliability.[10] A control center may be located either with a power station or separately, but in either case it is capable of integrating the system.[11] Although an integrated system provides greater reliability, as power can easily be transferred from one area to another, it also presents a vulnerability. An attack on the control subsystem can produce cascading failures throughout the system, causing overloads and extended equipment failure.[12] Disruption of the control subsystem has the potential to cause problems so severe that the need for further air attacks is substantially reduced.

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Another way of interdicting electrical power at the source is to attack the transmission subsystem. Transformers receive electricity and convert it to a higher voltage for transmission along high-voltage power lines.[13] The Office of Technology Assessment identifies these "stepped-up" transformers as the primary vulnerability of the transmission subsystem.[14] Furthermore, unlike the generation subsystem, which is shielded by a generator hall, stepped-up transformers are located in open-air transformer yards where high-voltage power lines converge, and are thus vulnerable to air strikes.

The distribution network presents a much less profitable target for aerospace power. After electricity is transmitted on the high-voltage power lines, it is received at a load center, converted back to a lower voltage ("stepped down") and disbursed to users throughout the network. These stepped-down transformer stations are smaller and present a less identifiable target for air strikes. Unlike their larger cousins, they are of a standard design and are readily interchangeable.[15] Consequently, the impact of an aerial attack on this part of the system is short-term and restricted to the limited area supplied by the particular transformer.

Strategic Thought: Fact or Myth

The alleged strategic value of attacking electricity is best reflected in Colonel Warden's concept of the Five Strategic Rings, although the basic presumption that aerial attack of a nation from the "inside out" will yield strategic results has been in existence in varying forms since the 1930s.[16] Planners theorized that the synergistic effects of targeting schemes devised to turn out the enemy's lights would extend beyond mere military consequences and have a decisive impact on its sociopolitical and economic infrastructure. A brief survey of history suggests that this assumption remains in doubt.

Customary and conventional law of noncombatant immunity has had difficulty keeping pace with weapons technology.

In World War II, both Allied and German planners designed air plans to exploit the purported advantages of this hypothesis. The Allies' Air War Plans Document gave the highest priority to targeting electricity, because German industry relied almost exclusively on electric motor power.[17] Likewise, following its loss at Stalingrad, Nazi Germany, through its *Aktion Russland* plan, sought to regain momentum by attacking the Soviets' interconnected electric power grid.[18] Circumstances forced the belligerents to reprioritize their war efforts and reduce the importance of the systematic targeting of the enemy's national electric power grid, and neither plan was put into effect. Thus, at the close of World War II, while there continued to be significant interest in electricity as a target set, no concrete data existed to support the theory.

During the early phase of the Korean War, the targeting of electricity was virtually nonexistent. As the conflict wore on, however, the Truman administration began to look for a way to force North Korea and its Communist sponsors to be more amenable to peace. In 1952, the United States turned to the Air Pressure Strategy to accomplish this goal.[19] Planners believed targeting electric power would increase the enemy's costs of war, reduce its warfighting effectiveness and impose sufficient hardship on the civilian population that the leadership would be coerced into a more tractable negotiating position.[20] Tactically, the operation was extremely successful, but it failed to achieve the sought-after strategic results. China and the USSR increased their technical assistance, and North Korea was able to satisfy its electrical needs through portable generators. Despite the loss of primary electrical power, the leadership maintained its resolve and continued to fight.

In Vietnam, the United States once again resorted to airpower as a means of bringing the Communist government to heel. North Vietnam's electric power was a primary target of Operation Rolling Thunder and Linebacker I and II. It was postulated that the systematic destruction of the electric power system would induce capitulation.[21] As in Korea, the operations were tactical success-

es,[22] but strategic failures. Despite the loss of nearly all electrical power, the Hanoi government was able to implement sufficient curative measures—public conservation, manual tooling, portable generators and relocation of military industrial production—to sustain its efforts to unify Vietnam.

Obviously, the role of strategic bombing differs in context from total war (World War II) to limited war (Korea and Vietnam). Nevertheless, its history provides little proof that targeting national electric power production achieves the purported wide-ranging ramifications over the scope of the Five Rings.

Targeting and the Law: Noncombatant Immunity Issues

The requirement that an operational commander refrain from conduct that exposes civilians to unnecessary risk of harm is well-settled and universally accepted as both customary and conventional law.[23] The regime of noncombatant immunity requires belligerents to distinguish at all times between the noncombatant civilian populace and combatants, and between civilian and military objects, and to direct operations only against military objectives.[24] The principles of discrimination and proportionality are the fundamental components of noncombatant immunity and serve as the cornerstones of *jus in bello.* Although the concept of noncombatant immunity evolved from the thirteenth-century philosophical and theological writings of St. Thomas Aquinas, its antecedents originated in the ancient writings of the Greek ethicists Aristotle and Plato, and the Roman philosopher-statesman Cicero.[25] The concept derives its present-day construction from the Hague and Geneva Conventions.[26] Applicable to the means and methods of warfare across the entire spectrum and in every medium, noncombatant immunity was originally developed to insulate civilians from the ravages of land warfare. However, the customary and conventional law of noncombatant immunity has had difficulty keeping pace with weapons technology, especially where aerial bombardment is involved.

In 1938, British Prime Minister Neville Chamberlain posited three established principles of international law applicable to air warfare:

> It is a violation of international law to bomb civilians as such and to make deliberate attacks upon civilian populations. Targets which are aimed at from the air must be legitimate military objectives and must be capable of identification. Reasonable care must be taken in attacking these military objectives so that by carelessness civilians in the neighborhood are not bombed.[27]

There has been general concurrence with Chamberlain's standard of reasonable care and broad consistency in the interpretation of these rules between the United States government and humanitarian law advocates.[28] Nevertheless, a primary point of contention continues regarding issues of military necessity, humanity, discrimination and proportionality as subsumed in the concept of collateral damage.[29]

The U.S. Air Force defines military necessity as the "principle which justifies measures of regulated force not forbidden by international law which are indispensable for securing the prompt submission of the enemy, with the least possible expenditures of economic and human resources."[30] The use of force must at all times minimize civilian casualties and prohibit disproportionate and indiscriminate death and destruction in accordance with the principles of military necessity, humanity, discrimination and proportionality. The crux of the debate between the U.S. military's interpretation of the legal obligations imposed by these principles and the humanitarians' view resides in the discussion of the appropriate methodology to be applied when calculating the relative values of discrimination, proportionality, military advantage and permissible collateral damage. Presently, the United States adheres to the view that proportionality is equivalent to a prohibition on the direct or negligent targeting of civilians.[31] Furthermore, the U.S. view asserts that proportionality is calculated on the basis of an overall campaign rather than on a target-by-target basis.[32] Humanitarians argue that the focus of the U.S. military on direct injury or death as the exclusive calculus for collateral casualties is a reflection of short-sighted thinking. They assert that the collateral damage problem to be addressed is not so much the direct civilian casualties resulting from an attack, but rather the reverberating effects of attacks on civilian infrastructure, such as electricity.[33] In essence, humanitarians are suggesting that the concept of collateral damage be broadened to keep pace with weapons technology and societal change. In their view, this is the appropriate calculus for the determination of what constitutes disproportionality and indiscriminate attacks. Advocates of this position further contend that customary and conventional law require that collateral damage be assessed by this model. In support of this assertion they rely upon the requisites of Protocol I Additional to the 1949 Geneva Conventions.[34]

Humanitarians argue that the focus of the U.S. military on direct injury or death as the exclusive calculus for collateral casualties reflects short-sighted thinking.

Protocol I sets out detailed rules, and codifies for the first time the customary nature of noncombatant immunity law.[35] The basic premise of Protocol I is reflected by the following phrase:

> . . . the civilian population as such, as well as individual civilians, shall not be the object of attack. Acts or threats of violence the primary purpose of which is to spread terror among the civilian population are prohibited.[36]

The Protocol has been hailed by scholars and statesmen alike as bringing needed clarity to the rather abstract nature of noncombatant immunity law, and eliminating from consideration certain categories of targets that had previously been deemed lawful.[37] It also establishes a precise definition of indiscriminate attacks, including:

> those which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.[38]

At present, there are 143 parties to the Protocol; however, it has yet to gain universal acceptance, as the United States continues to withhold ratification.[39] The United States has not ratified Protocol I, due to what the Reagan administration termed "fundamental and irreconcilable flaws,"[40] and the United States is thus not bound by the Protocol.[41] Humanitarians argue that the refusal to ratify Protocol I is a moot point that fails to insulate the United States from the binding character of its substantive law requirements. Citing U.S. military manuals on international law, which use language consistent with and in some cases identical to the Protocol,[42] and specific statements by State Department spokespersons,[43] humanitarian advocates assert that U.S. practice has recognized the customary nature of the Protocol. They essentially argue that the United States is bound by customary international law as codified by Protocol I. Recognizing that customary international law prohibits attacks that can be expected to result in excessive civilian casualties, they contend that the systematic nullification of electric power is such an attack and therefore tantamount to an indiscriminate use of force.

The systemic nullification of electric power is tantamount to an indiscriminate use of force.

This debate raises a number of interesting questions, particularly in view of the occurrences in the Persian Gulf War, and returns our focus from noncombatant immunity in general to the law as it pertains to the specific issue of electricity as a target set. As some scholars have noted, the Gulf conflict is relevant as the most recent example of hostilities involving a significant number of diverse states from which to glean modern nation-state practice.[44] The Gulf conflict, especially with regard to U.S. aerospace operations, has caused many to wonder whether the principles of noncombatant immunity continue to have any merit.[45] The issue is most articulately phrased by the following query:

> . . . whether the concept of proportionality has any content in customary international law independent of the prohibition of direct attacks on civilians, or of negligence in either the selection of the

target or the conduct of the attack itself?[46]

Is Chivalry Dead: Iraq

> Our air strikes were the most effective, yet [the most] humane, in the history of warfare.[47]
>
> —George Bush, May 29, 1991, as quoted in the Department of Defense's Title V report to Congress, "Conduct of the Persian Gulf War."

> The enormous devastation that did result from the massive aerial attacks suggests that the legal standards of distinction and proportionality did not have much practical effect.[48]
>
> —Oscar Schachter, "United Nations Law in the Gulf Conflict."

The stark contrast between these two statements causes one to wonder whether they refer to the same set of hostilities. President Bush's comment reflects the view held by most Americans—and echoes the numerous pronouncements by Coalition spokespersons—that extreme care was taken to avoid damage to civilian installations. Notwithstanding these declarations of benign intent, it is difficult to reconcile the virtual total destruction of the Iraqi civilian life-support system with the prophylactic requirements of noncombatant immunity. There was a strikingly evident imbalance between the supposed military advantage to be gained from attacking electricity and the discrimination and proportionality constraints devised for the protection of noncombatant civilians.

The Persian Gulf War ushered in the new age of hyperwar: the integration of space-based information systems; Command, Control, Communications, Computers and Intelligence (C4I); and warfare platforms expands the twentieth-century battlefield into the all-encompassing realm of twenty-first-century battlespace. Exploiting the presumptive weaknesses of the enemy's national electric power grid is a primary component of the aerospace aspect of hyperwar. As alluded to earlier, the concept of the Five Rings envisions an "inside-out" approach to the enemy's strategic center of gravity. The Coalition air operation, in large part taken from Colonel Warden's warfare philosophy, was to put into effect the lessons learned from World War II, Korea and Vietnam. The systematic nullification of the Iraqi national electric power grid was designed to accomplish a dual purpose. First, planners sought to cripple key elements of Iraq's military apparatus, specifically air defense systems, telecommunications systems and the command and control network.[49] Second, they surmised that the degradation of electrical power would paralyze the

leadership,[50] cause political turmoil and lead to the demise of Saddam Hussein.

In terms of pure destruction and effective interdiction of electric power, the air operation was highly successful. Electric power in Iraq was, for the most part, terminated on the first night of the war.[51] By war's end, the Iraqi system had been reduced to approximately 15 percent of its prewar capability.[52] The U.S. Department of Defense's final report to Congress, "Conduct of the Persian Gulf War," (known as the "Title V" report) suggests that the foundational theories of targeting electricity were proven to be correct:

> Attacks on Iraqi power facilities shut down their effective operation and eventually collapsed the national power grid. This had a cascading effect, reducing or eliminating the reliable supply of electricity needed to power NBC (nuclear, biological and chemical) weapons, production facilities, as well as other war-supporting industries; to refrigerate bio-toxins and some CW (chemical warfare) agents; to power the computer systems required to integrate the air defense network; to pump fuel and oil from storage facilities into trucks, tanks, and aircraft; to operate reinforced doors at aircraft storage and maintenance facilities; and to provide the lighting and power for maintenance, planning, repairs and the loading of bombs and explosive agents. This increased Iraqi use of less reliable back-up power generators, which, generally are slow to come on line, and provide less power.[53]

However, other opinions suggest there is far too little evidence to make definitive assumptions about the impact of the loss of electricity on Iraq's actual military capability and political cohesion.[54] It is conceded that the systematic neutralization of the electric grid did cause various subcomponents of the Iraqi war machine to break down, providing a tactical advantage; however, there are too many outstanding variables to disprove the historical trend-that nullification of electricity has only minimal effect. In view of the paucity of empirical evidence providing the real-term advantage gained, many have considered the devastation suffered by the civilian population as a result of the interdiction of electric power to be disproportionate.

The Bush administration clearly recognized that the systematic nullification of electricity and the concomitant impact on civilians would be a controversial issue[55] and anticipated that the disagreement over Protocol I and the disparity in viewpoints on collateral damage would come to the forefront. The Title V report seeks to explain the rationale behind the targeting plan and to allay criticism. Press releases issued during the war aggressively refuted naysayers, constantly referring to the genuine commitment of Coalition forces to minimize collateral casualties.[56] Gen. Buster Glosson, commander of the Coalition's air operations, said that targets were selected to minimize collateral damage, reduce recuperation time and limit the impact on the civilian pop-

ulation.[57] In essence, the Coalition, led by the United States, argued that the targeting scheme was mandated not only by military necessity, but also by the desire to minimize casualties (both combatant and noncombatant). Unfortunately, the death toll belies this rationale. It has been conservatively asserted that more than 70,000 noncombatant deaths can be directly attributed to the systematic elimination of Iraq's electrical power.[58]

The Gulf War Air Power Survey (GWAPS) concluded that the systematic neutralization of the electric power grid was achieved with "remarkably little collateral damage."[59] The evidence supporting the GWAPS finding is undisputed: the incidence of unintended injury or death sustained by noncombatants as a direct result of aerospace operations was surprisingly low.[60] However, this estimate fails to include the collateral casualties that resulted from the reverberating effects of the attacks. The Gulf War provides a real-world laboratory within which to examine the reality of collateral damage, based upon the lethality of twenty-first-century warfare. Never before has there been so much devastation visited upon a civilian population as a result of accurately placed munitions. Civilian harm was exacerbated by the fact that noncombatants were otherwise spared the direct effects of urban aerial assault by the use of Precision Guided Munitions (PGMs) and other highly efficient techniques,[61] which eliminated life-support systems but left the civilian population in place. The impact on the health infrastructure was profound, resulting in reduced hospital capacity; inability to refrigerate adequate quantities of vaccines and medicines; limited capacity to purify and distribute water; and an increase in waterborne diseases due to the inability to treat and dispose of raw sewage.[62] Furthermore, it was subsequently discovered that agricultural production was significantly affected, as the power loss reduced irrigation capacity to Iraq's arable land, resulting in decreased yields.[63]

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The United States accepts as customary international law the prohibition against intentionally targeting drinking-water installations, foodstuffs, crops, livestock and other objects indispensable to the survival of the civilian population.[64] However, in the case of Iraq, these crucial items were lost to the noncombatant populace as a result of the reverberating effects of the aerial bombardment of electricity. Some would argue that such is the price of war. But, this argument only has merit if the nullification of electricity conferred a direct and concrete military advantage commensurate or superior in its effect when balanced against the unintended casualties. There are a number of authors who either challenge the proof submitted by the United States as to the military advantage gained, or specifically assert that the complete destruction

of the infrastructure of a highly developed post-industrial state was in itself excessive and a violation of the Coalition partners' obligations under the law of noncombatant immunity.[65] Such a view ignores a significant legal distinction between the intentional targeting of items essential for civilian survival and the second-order effects resulting from striking lawful target sets. Moreover, the knotty problem presented by dual-purpose power grids is a conundrum worthy of King Gordius himself. Nonetheless, the tens of thousands of Iraqi noncombatant casualties resulting from the reverberating effects of the intentional targeting of the national power grid certainly argues for a consensus on collateral damage and incidental injury more protective than current agreements.

The argument that the legality of targeting electricity should be reassessed because of weapon lethality and precision technology is only part of the issue. The merit, if any, in the call for a reassessment lies fundamentally in the interdependent nature of the modern-day interconnected civil support system. As we progress toward the twenty-first century, more and more people are moving into urban areas for increased job opportunities and improved quality of life, particularly in the developing nations.[66] The ever-growing city populations and resultant energy demand require far greater integration of those mechanisms of life sustainment than before to maintain operating efficiencies that do not outstrip capacity. Electricity is the life's blood of the modern-day state, especially in the core urban centers.[67] Baghdad is a distressing example of the cascading repercussions of the systematic elimination of electric power in an integrated urbanized support structure. The devastation that rippled throughout the Iraqi infrastructure resulted in the death of 30 times more civilians than did direct war effects.[68] Civil support has become so dependent upon electricity that even temporary interruption can wreak havoc upon the most advanced and redundant power grids.[69] The increased risk to noncombatants as a result of this movement toward global urbanization and the resultant dependency upon electricity are the principal reasons that a reassessment may be in order.

Law is often seen to be reflective of the ever-evolving human condition. The law of armed conflict should be particularly sensitive to this need, in view of the horrific impact that war has on the lives and welfare of innocent men, women and children who have no involvement in or ability to affect the decisions of war. If a reassessment of the target set is inappropriate or too hard, then perhaps refining the definition of collateral damage to require a more detailed examination of the potential reverberating effects of aerial attacks would be more acceptable. An accommodation of the latter sort would be a compromise that enhances protection for those most susceptible to the vagaries of war, while not completely stripping campaign planners of an option they consider vital to success.

Jus Ad Bellum: New Considerations

To what extent, if any, should the positive law of noncombatant immunity be linked to moral or religious beliefs regarding the justifiability of actions undertaken in war?[70] Is it truly an unavoidable conclusion that *jus ad bellum* provides the context within which *jus in bello* has content and meaning, and as such dictates the propriety of the application of force? If these questions are answered in the affirmative does it, as Dorothy Sayers concludes, "[transform] the laws of combat into an arbitrary code similar to the rules of a game, having no validity except in a general consensus of opinion?"[71] As previously outlined, the contemporary law of noncombatant immunity has its basis in moral theory, but over time it has evolved into a distinct process of required behavior. The reemergence of *jus ad bellum* as a relevant factor bearing upon the interpretation of the legal issues of *jus in bello* clouds, to some degree, that process. Progress by the international community in *jus in bello* had caused many to relegate *jus ad bellum* to the dustbin of history. However, in the eyes of many scholars and theologians, the justifications offered by the Coalition forces in the Persian Gulf War in support of the means and methods of warfare employed has, for better or worse, breathed new life into the principle of just war.[72]

It has been suggested that the international community would never have tolerated the collateral casualties resulting from the Gulf War aerospace operations had the Coalition not employed the rhetoric of just war.[73] The Coalition's public relations strategy effectively impressed upon the world community that although there would be loss of innocent life, such loss would be in support of a noble cause. This is not to say that the Coalition engaged in mere public relations. The United States was quite adamant on the issue of Coalition compliance with the standards of *jus in bello*. However, the standards as applied in the Gulf are arguably less controversial because of the implications of morality and rightness injected by the resort to *jus ad bellum* for legitimization.[74] The almost unanimous international condemnation of Saddam's attack on Kuwait and the unusual restraint that nations exercised in withholding criticism of Coalition tactics reflect that *jus ad bellum* has clearly reemerged as a substantive issue in the law of armed conflict. One commentator summarized it in the following manner: "the interpretation of [the] proportionality [requirement] by the Coalition forces reflects the perception that their use of force was a legal response to Iraq's unlawful force."[75] The general international acceptance of the Coalition's overall activities in pursuit of its just cause, particularly the aerial bombardment in and around Baghdad, tends to suggest that assessment of direct and concrete military advantage is measured in direct proportion to the justness of one's *casus belli*. Thus, the concepts of proportionality and discrimination would seem for the moment to have no application beyond negligence or intentional behavior. As outlined by Judith Gardam, in light of Coalition practice in the Gulf, the legal regime governing proportionality and the prevention of collateral casualties proscribes:

a. only those attacks that intentionally target civilians; and
b. those involving negligence, either in ascertaining the nature of a target or in the conduct of the attack itself, so as to amount to the direct targeting of civilians.[76]

These tenets demonstrate the prevailing military focus on short-term intent or direct effect, as opposed to unintended, but foreseeable, long-term consequences of military activity. Nonetheless, this construction appears to beg the issue presented by the common law principle that reflects that one is presumed to have intended the expected, natural and probable consequences of one's actions. Under the premise as reflected by (a) and (b) above, considered from the conceptual viewpoint with *jus ad bellum* as theoretical support, the finding of excessive casualties cannot be asserted where in the course of aerial bombardment care was taken in identifying the nature of the target and the attack was executed in a diligent manner.

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Lessons for Future Missions

The campaign for the disqualification of electricity as a lawful target set will in all likelihood remain undecided for the foreseeable future. In treating this issue, humanitarian activists assert that the military's interpretation of what is lawful is not the complete source for determining the applicable standard. Substantively, in their view, the unknown and unanticipated effects[77] should be the reason to reconsider electricity as a legitimate target set. Objectively, the purpose of the law of armed conflict, of which noncombatant immunity is only part, is not to impede the waging of war by legitimate means but to focus the effect of hostilities upon enemy combatants and to preclude unnecessary human misery and physical destruction.[78] Humanitarians are adamant that targeting national electric power grids fails to satisfy these criteria. To date, the military establishment has vigorously resisted this interpretation. As a practical matter, legalistic limitations on the use of force deemed inconsistent with the fundamental principles of warfare that inhibit the legitimate pursuit of national political and military aims will go unheeded by the international community. Whether the uses of modern warfare require a *per se* rule is unclear. Arguably, in the fast-paced, synchronized environment of twenty-first-century battlespace, the temporary interruption of electrical power could potentially accomplish a given military objective without the attendant devastation suffered by Iraq. It is unrefuted that the nullification of electricity can potentially provide a short-term or tactical military advantage, such as degradation of enemy air-defense systems. However, the

reputed long-term operational and strategic benefits remain questionable. The national and international debate generated by critical studies of U.S. air operations targeting electricity in the Gulf and the current administration's decision to reconsider the viability of Protocol I suggest that this element of traditional military orthodoxy may eventually be revised for the better protection of noncombatants.

The military establishment's defense, that the use of precision munitions addresses the issue of collateral damage as it bears upon aerospace power and the targeting of electricity, is woefully insufficient. As noted, under the law as currently defined, the military is absolutely correct and was proven to be so in the Gulf conflict. Precision technology limits the immediate and direct harmful effects of aerial bombardment. However, one must take issue with the assertion that the systemic destruction of civil infrastructure through the use of precision weapons actually reduces the harmful effects of war. Ironically, the very capability of precision potentially augurs greater collateral casualties, not less. The accuracy of precision technology breathes reality into the theory of the Five Strategic Rings, by permitting the warfighter to avoid direct engagement of the enemy and to attack him indirectly in-depth beyond the battlefield, by striking civil infrastructure—located in the midst of the civilian population—which supports the enemy's war effort. This is clearly both an efficient and effective application of force without the normal risk of loss in national blood and treasure. Unfortunately, such a methodology not only impedes the enemy in some respects, but it also eliminates the civilian life-support system. It would be impractical to advocate that a nation not use all legitimate means within its power to safeguard its personnel and attain victory. That is certainly not the thrust of the opinion offered here. It would be equally ridiculous to advocate the prohibition of PGMs and herald a return to the imprecise iron bomb. However, it is neither impractical nor insensitive to strategic concerns to urge that targeting concepts and the law that governs them keep pace with technology. Otherwise, improvements in aiming will be far less beneficial to mankind than science intended.

Shaping the rule of law in warfare for the better protection of noncombatants is an appropriate matter for the exercise of our international leadership.

Targeting considerations must extend beyond direct effects. Collateral damage, by legal definition, must include a requirement to examine the reverberative effects of military action. Every target set is different, but some targets (like electricity), due to the potential for long-term effects, demand that collateral damage be considered with a significantly broader view. One could argue that if this suggestion is accepted, the campaign planner, in addition to executing a military function, would have to engage in an esoteric estimation

to determine at which point the reverberative effect becomes so distant from the military action as to be too attenuated for proximate cause. This would essentially transform campaign-strike planning into an exercise in theoretical scholastic postulation. Such a characterization would be insincere; in essence, the planner's function does not change or become unduly burdensome merely because an additional level of cognition is required in order to fulfill faithfully the obligations of discrimination and proportionality relative to collateral costs. Neither would it require some hypothetical collateral casualty assessment.

An abstract determination as to what is an acceptable level of noncombatant casualties is impossible, has no practical value and would be subject to interminable debate. However, as twenty-first-century warfare looms on the horizon, the events in Iraq reflect that greater restraint—i.e., a behavioral change in the waging of war—is necessary. As the revolution in military affairs takes hold, and the rationale for defense strategy and planning shifts from threat to capability and from liability to opportunity, the United States will be free to think in terms of shaping the future.[79] Consequently, civilian leaders and military planners must contemplate how the blunt instrument of military force can be fashioned into the more precise political vehicle envisioned by the military strategist Karl von Clausewitz. As the sole surviving superpower, the United States has substantial influence over the character of the international system. Shaping the rule of law in warfare for the better protection of noncombatants is an appropriate matter for the exercise of our international leadership. As technology increases military reach and the global community becomes more interdependent and smaller in terms of time and space, failure to develop mutual understandings and nation-state initiatives to reduce the pernicious effects of armed conflict progressively will result in noncombatant immunity becoming more of a theoretical ethic than a standard of substantive protection.

Notes

1. U.S. Department of Defense, *Conduct of the Persian Gulf War, Final Report To Congress, 200 (1992)*, Pursuant to Title V of the Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act of 1991, Pub. L. No. 102-25. "Coalition" refers to the nations arrayed together against Iraq in the Persian Gulf War. The United States led the Coalition, which also included 34 other countries. See Arthur H. Blair, *At War in the Gulf: A Chronology* (College Station, TX: Texas A&M University Press, 1992).
2. Thomas E. Griffith, "Strategic Air Attacks on Electrical Power: Balancing Political Consequences and Military Action," *Strategic Review* (Fall 1993): 38.
3. John A. Warden, III, "The Enemy as a System," *Airpower Journal* (Spring 1995): 44.
4. Daniel T. Kuehl, "Airpower vs. Electricity: Electric Power as a Target for Strategic Air Operations," *Journal of Strategic Studies* 18, no. 1 (March 1995): 251.
5. *Jus ad bellum* are the rules pertaining to the legality of the use of force, which led to the development of the principle of just war. *Jus in bello* are the rules that govern the means and methods of conducting war, which were synthesized into the Law of the Hague and the Law of Geneva.

6. Griffith, 39; Kuehl, 259.
7. Thomas E. Griffith, *Strategic Attack of National Electrical Systems* (Maxwell, AL: School of Advanced Airpower Studies Air University Press, 1994), 5.
8. Ibid.
9. Ibid., 6.
10. Burr W. Leyson, *The Miracle of Light and Power* (New York: E.P. Dutton & Co., Inc., 1955), 45-47; North American Electric Reliability Council, *Electricity Transfers and Reliability* (Princeton, NJ: North American Electric Reliability Council, October 1989), 24-26.
11. Leyson; Donald G. Fink and H. Wayne Beaty, eds., *Standard Handbook for Electrical Engineers* (New York: McGraw-Hill, Inc., 1987) 16-8-12.
12. Griffith, *Strategic Attack of National Electric Systems*, 9.
13. Ibid, 7.
14. U.S., Congress, Office of Technology Assessment, "Physical Vulnerability of Electric Systems to Natural Disasters and Sabotage," OTA-E-453 (Washington, DC: Government Printing Office, June 1990), 47. The OTA appraisal reflects that, similar to the turbine/generator combination, stepped-up transformers are unique and typically custom-designed for the specific power system; therefore, spares are not in ready supply.
15. Griffith, *Strategic Attack of National Electric Systems*, 8; Fink and Beaty, 10-52 and 10-53.
16. U.S., Air Force Historical Agency, Maxwell Air Force Base, 248.211-229. For a discussion on the effectiveness of strategic bombing in general, see Everest E. Riccioni, "Strategic Bombing: Always a Myth," *Proceedings* (November 1996): 49.
17. Kuehl, 238-239.
18. Ibid., 242-243.
19. Ibid., 244. Earlier in 1950, the Far East Air Forces (FEAF) attacked the Fusan power plant. Subsequently, FEAF argued that knocking out the North Korean electric power system would lower their morale by putting out their lights, bring some electrically powered industry to a halt, and eliminate most of the surplus power being exported to China.
20. Ibid., 246-247. Robert Frank Futrell, *The United States Air Force in Korea*, (Washington, DC: Office of Air Force History, 1983), 478-480. The operation commenced in the summer of 1952. North Korea was blacked out for more than two weeks, and over 90 percent of its electric power supply was eliminated, cutting off many thousands of small, virtually home-operated industrial facilities spread throughout North Korea. More importantly, the overall power supply within Manchuria was cut by 23 percent for the rest of 1952, and 60 percent of its key industries failed to meet their annual production targets.
21. Kuehl, 248. The rationale for attacking the North Vietnamese electric power system was not to turn the lights off in major population centers, but rather, to deprive the enemy of a basic power source needed to operate certain war-supporting facilities and industries (Earle Wheeler, Chairman of the Joint Chiefs of Staff, Memorandum to President Lyndon B. Johnson, May 5, 1967).
22. Griffith, "Strategic Air Attacks on Electrical Power," 40. By the end of May 1967, 14 of the 22 electrical power targets, including generating plants and transformer substations, had been attacked, virtually eliminating electrical power production in North Vietnam. Eighty-five percent of the generating capacity was destroyed, and the transmission network was heavily damaged.
23. Frits Kalshoven, *Civilian Immunity and the Principle of Distinction*, 31 AMERICAN UNIVERSITY LAW REVIEW 855 (1982); "Convention Respecting the Laws and Customs of War on Land" ("Hague Convention"), October 18, 1907, 36 Stat. 2277, 205 Consol. T.S. 277, Art. 22; "Protocol Additional to the Geneva Conventions of 12 August 1949,

Relating to Protection of Victims of International Armed Conflict" (Protocol I), 1125 U.N.T.S. 3 (1977), Articles 51 and 52.

24. Protocol I, Art. 48.
25. Neil and Adele Fulton, "United States Military Force and Bosnia," Civitas Institute, *Issues & Opinions*, Vol. 93-1 (May 1993). At http://www.valley.net/~civitas/i&o93-1.html.
26. Hague Convention; "Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field," August 12, 1949, 6 U.S.T. 3114, 75 U.N.T.S. 31; "Geneva Convention for the Amelioration of the Condition of the Wounded, Sick and Shipwrecked Members of the Armed Forces at Sea," August 12, 1949, 6 U.S.T. 3217, 75 U.N.T.S. 85; "Geneva Convention Relative to the Protection of Civilian Persons in Time of War," August 12, 1949, 75 U.N.T.S. 287.
27. Great Britain, Parliamentary Debates (Commons), 5th ser., 337 (June 21, 1938): 937.
28. U.S., Air Force Pamphlet AFP 110-31, *International Law-The Conduct of Armed Conflict and Air Operations*, 1976, 1-6.
29. The terms "collateral damage" and "collateral casualties" will be used interchangeably.
30. Air Force Pamphlet, 1-5 and 1-6.
31. Parks, *Air War and the Law of War*, 32 AIR FORCE LAW REVIEW 1 (1990): 168-218.
32. Ibid.
33. William M. Arkin, "Tactical Bombing of Iraqi Forces Outstripped Value of Strategic Hits, Analyst Contends," *Aviation Week & Space Technology*, (January 27, 1992): 62-63; Walid Doleh, Warren Piper, Abdel Qamhieh, and Kamel al Tallaq, *Report by the International Study Team, Health and Welfare in Iraq After the Gulf Crisis: An In-Depth Assessment, Electrical Facilities Survey*, October 1991.
34. Protocol I, Article 48.
35. Ibid., Articles 48-58.
36. Ibid., Article 51.2.
37. Ibid., Article 56. Discusses the criteria involved in attacking targets that contain dangerous forces, such as dams, nuclear power plants, etc.
38. Ibid., Article 51.5(b). Article 51.5 begins: "Among others, the following types of attacks are to be considered as indiscriminate: a) an attack by bombard by a methods or means which treats as a single military objective a number of clearly separated and distinct military objectives located in a city, town, village or other area containing a similar concentration of civilians or civilian objects."

    Found also at Article 57.2 (a)(iii). "Excessive" was substituted for "proportionality" due to a disagreement in Committee. The Romanians argued that the term "proportional" was inconsistent with international humanitarian law (*Official Records of the Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law Applicable in Armed Conflicts, 1974-1977*, 14 [1977], 299-316).
39. *SIPRI (Stockholm International Peace Research Institute) Yearbook 1996: Armaments, Disarmament and International Security* (New York: Oxford University Press, 1996), 780; Aldrich, *Prospects for United States Ratification of Additional Protocol I to the 1949 Geneva Convention*, 85 AM. J. INT'L. L. 1, 3 (1991). The United States was a primary moving force behind the Protocol and signed it on the first day it was opened for signature. However, subsequently, the Reagan administration was advised that the document was incompatible with U.S. policy and practice, and thus it chose not to submit the Protocol to the Senate for its advice and consent to ratification.
40. "Letter of Transmittal from President Ronald Reagan, Protocol II Additional to the 1949 Geneva Conventions, and Relating to the Protection of Victims of Non-International Armed Conflicts," S. Treaty Doc. No. 2, 100th Cong., 1st sess., at III (1987), Reprinted in 81 AM. J. INT'L. L. 910 (1987).
41. International law acknowledges that the defending nation bears the primary responsibility for the protection of the civilian populace. In the U.S. view, Protocol I at-

tempts to shift the burden of primary responsibility to the attacker, regardless of the action taken by the defender, such as placing military objects in close proximity to civilians. The administration found this proposed modification of long-standing law unacceptable.

42. Air Force Pamphlet, 5-9. The U.S. Air Force shall "refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated."
43. Michael J. Matheson, Deputy Legal Adviser, U.S. Department of State, "The United States Position on the Relation of Customary International Law to the 1977 Protocols Additional to the 1949 Geneva Conventions" (Lecture at the Sixth Annual American Red Cross-Washington College of Law Conference on International Humanitarian Law: A Workshop on Customary International Law and the 1977 Protocols Additional to the 1949 Geneva Conventions, Washington, DC, January 22, 1987). Matheson commented upon the U.S. support for many of the rules in Protocol I, stating that the United States concurred with the customary nature of many aspects of the accord.
44. Gardam, *Noncombatant Immunity*, 32 VIRGINIA JOURNAL OF INTERNATIONAL LAW 813 (1992).
45. George A. Lopez, "The Gulf War: Not So Clean," *Bulletin of the Atomic Scientists*, 47 no. 7 (September 1991): 30-35.
46. Gardam, 831-832.
47. *Conduct of the Persian Gulf War*, 117.
48. Schachter, *United Nations Law in the Gulf Conflict*, 85 AM. J. INT'L. L. (1991), 452, 466.
49. Kuehl, 251.
50. U.S., Air Force, *Gulf War Air Power Survey, II*, Part I, 93.
51. Doleh, Piper, Qamhieh and al Tallaq, 4. The report stated that at least 10 of 16 power stations visited were attacked on the first day of the war, and at least 14 were attacked multiple times, one of which was attacked 15 minutes before the ceasefire.
52. Kuehl, 254.
53. *Conduct of the Persian Gulf War*, 200.
54. Kuehl, 256. "The Iraqi strategic air defense system was certainly fragmented as intended by Coalition air campaign planners, but there is no way to determine analytically how much the loss of the electric grid contributed to this. The same holds true for damage to facilities involved in nuclear-chemical-biological weapons research."
55. Rick Atkinson, *Crusade: The Untold Story of the Persian Gulf War* (Boston: Houghton Mifflin, 1993); *Needless Deaths in the Gulf War; Civilian Casualties During the Air Campaign and Violations of the Laws of War* (New York: Human Rights Watch, 1991).
56. "Because of our interest in making sure that civilians did not suffer unduly, we felt we had to leave some of the electrical power in effect, and we've done that" (Gen. Norman Schwarzkopf, Press Conference, January 30, 1990).
57. "...At electrical production/transformer stations the objective will be the transformer/switching yards and the control buildings in these yards. Boilers and generators will not be aimpoints" (Brig. Gen. Buster C. Glosson, "CENTAF Memorandum to All Plans Officers, Subject: Target Guidance," January 12, 1991). Unfortunately, due to confusion and other reasons, the guidance was not followed, and 14 power plants suffered damage to boilers, generator halls, or turbine assembly.
58. Arkin, 63.
59. *Gulf War Air Power Survey, II*, Part II, 342-343.
60. Beth Osborne Daponte, "Iraqi Casualties from the Gulf War and Its Aftermath" (Paper presented at the Defense and Arms Control Studies Program, Center for International Studies, Massachusetts Institute of Technology, Cambridge, MA, October 7, 1992).
61. William M. Arkin, "The Environmental Threat of Military Operations" (Paper presented at the Symposium on Protection of the Environment During Armed Conflict

and Other Military Operations, Naval War College, Newport, RI, September 20-22, 1994).

62. Doleh, Piper, Qamhieh and al Tallaq, 2.
63. Ibid.
64. U.S., Navy, *The Commander's Handbook on the Law of Naval Operations*, NWP 1-14M/FMFM 1-10/COMDTPUB P5800.7 (1995), 8-1.
65. Gardam, 828.
66. Edward Carr, "The New Prize," *The Economist*, June 18, 1994. Electrification is the means by which backwards people can pole-vault into the industrial-technological age. In Malaysia and Indonesia, demand for electric power is growing faster than the economy.
67. Margaret Kriz, "Several High-Voltage Disputes Divide Electric Utility Industry," *The National Journal* 28 no. 31 (1996): 1634. In assessing the societal value of electricity, E. Linn Draper, chairman and president of the Columbus-based American Electric Power Company, said: "At one time, electricity was a luxury, then it became a convenience. . . . It's plain that everybody thinks it's a necessity now."
68. Osborne Daponte.
69. Hector Tobar and Miles Corwin, "Outage Shows Technology's Fragile Links," *Los Angeles Times*, August 13, 1996, A1.
70. Wright, *Noncombatant Immunity: A Case Study in the Relation Between International Law and Morality*, 67 NOTRE DAME L. REV. 335, 339 (1991).
71. Dorothy Sayers, quoted in Wright.
72. George Bush, "Address to Annual Convention of the National Religious Broadcasters," Washington, DC, January 28, 1991. In James Turner Johnson and George Weigel, *Just War and The Gulf War* (Washington, DC: Ethics and Public Policy Center, 1991), 141.
73. Gardam, 833.
74. Johnson and Weigel, 4-5.
75. Gardam, 833.
76. Ibid., 834.
77. Kuehl, 265. When Bernard Shaw and the CNN team reported from the Al Rashid hotel, in Baghdad, that the lights and water had ceased to function, it seems that the air planners were taken by surprise. No one on the CHECKMATE staff (the body used during the Persian Gulf War for Air Staff planning) had realized that, with the loss of electricity, the water supply would also fail.
78. Navy, *The Commander's Handbook*, 5-1.
79. William A. Owens, "The Emerging System of Systems," *Proceedings* (May 1995): 36.