

**Direct Testimony of Edward V. Badolato
on Behalf of Virginia Electric and Power Company
Before The State Corporation Commission of Virginia
Case No. PUE-2007**

Q. *Please state your name, position, place of employment and business address.*

A. My name is Edward V. Badolato. I am the President and CEO of Integrated Infrastructure Analytics, Inc., which is a leading provider of specialized power, water and homeland security products and supports services and activities that span four key disciplines, including power generation, water purification, strategic decision making and security-related services to customers in the nuclear, energy, chemical, transportation, maritime, environmental and defense industries. (“IIA”). My business address is 1625 K Street, N.W., Suite 850, Washington, D.C. 20006.

Q. *What is your educational and professional background?*

A. I have been involved in the energy security field for over 30 years, focusing on oil, natural gas, electricity, coal, pipelines, transportation and nuclear power and have worked extensively on a full range of planning and security issues with major corporations, the U.S. government, state and local governments, as well as foreign governments and companies. I was Deputy Assistant Secretary for the Department of Energy’s (“DOE’s”) energy contingency planning and international energy security activities where I was the Secretary’s key troubleshooter for security and energy emergency planning under Presidents Reagan and Bush. I was also the principal architect of the U.S. government’s present day nuclear security weapons programs, as well as DOE’s emergency preparedness activities. I have conducted numerous security vulnerability assessments of energy, chemical and process facilities for both physical security and information technology. In the area of electric power, I have managed the assessment of the threat and vulnerability of the national power grids, and worked with the industry to develop plans for the mitigation of damage to both electric power and natural gas infrastructures from natural disasters, terrorism or sabotage. I am a retired Marine Colonel with a degree in mathematics and an engineering background with extensive “hands on” field experience in counterterrorism operations around the world and have developed unique threat assessment methodologies for both physical and cyber security programs. Currently, I am also a member of the National Academy of Science’s study committee on “Terrorism and the Electric Power Delivery System,” and serve on the boards of the Electronic Security Council, Maritime Security Conference, the Critical Infrastructure Resilience Conference and the GOVSEC Conference, and frequently appear on major television news programs as a Homeland Security, defense and terrorism expert.

Q. ***What professional experience does IIA have with national security preparedness as it relates to this proceeding?***

A. IIA, with its internationally known team of experts, has been providing security-related services to customers in the energy, nuclear, chemical, transportation, environmental and defense industries for decades. We provide a comprehensive package of national and homeland security capabilities, including vulnerability and risk assessments and analyses, to detect, prevent, prepare for and protect against terrorist attacks. Our support services incorporate security system improvements with disaster emergency preparedness planning and training, incident management and response and, in the case of energy security, planning for the safeguarding and security of electrical power facilities and contingency planning for dealing with power disruptions.

Q. ***What is the purpose of your testimony?***

A. I will describe the interrelationship between homeland security and electric reliability, especially in the northern Virginia, Washington, D.C. and suburban Maryland region, and the critical importance of maintaining reliable electric service in this region for government operations and national security.

Q. ***What is the criticality and importance of the National Capital Region to national security?***

A. The President and Congress recognized the unique and complex national security challenges that exist in the Washington/Virginia/Maryland region shortly after the 9/11 terrorism attack. This area is home to 12 local jurisdictions, two states, the District of Columbia, the three branches of U.S. government, 231 federal departments and agencies, the largest number of high-ranking defense contracting companies, 2,100 non-profit organizations and over 4.2 million Americans, 340,000 of which are federal workers. Therefore, this fourth largest U.S. metropolitan area of 6,000 square miles, considered critical to national security, was established as a part of the National Capital Region (“NCR”) by the Homeland Security Act of 2002. (See Map and Definition of the NCR in Attachment EVB-1).

Among the numerous national security-related federal government departments and agencies, all of the vital security and intelligence agency headquarters and many of their operational facilities are located in the NCR.

In addition to the government security and intelligence agencies, there is a concentration of 251 military bases from all services clustered in the tri-state area

that include a total of 204,258 military personnel. (See Maps and Lists of Military Installations in [Attachment EVB-2](#)).

To support the planning, logistics and operations of these agencies and military installations, a substantial network of non-government organizations, research and development corporations and industries are co-located as main divisions or subsidiaries in the NCR, which ranks fourth nationally in GDP at nearly \$288.3 billion. These include well over 100 defense contracting companies. (See List in [Attachment EVB-3](#)) Because of the geographic location of the area, various critical infrastructure chokepoints and hubs in the transportation, communications, technology, and energy industries are based in or go through the NCR.

For example, communication activities include the densest Internet operations (about 70%) in the U.S., key commercial and military satellite communications sites, FAA control centers and federal emergency operations centers. Therefore, information and technology giants have moved here dubbing this region the “Silicon Valley of the East.” In the energy infrastructure, vital pipelines transit the region, carrying both crude oil and finished product to storage and distribution centers along with natural gas to important national markets.

In the transportation area, the NCR’s aviation, roadways and rail facilities, including freight, passenger rail, transit systems and subways are among the busiest in the country. It has the second largest rail transit system and the fifth largest bus network in the U.S. Metrorail is second only to the New York City subway system in passenger ridership. In water distribution facilities, most water is pumped to various densely populated communities through elaborate regional systems.

The NCR also contains some of the nation’s and the world’s premiere financial institutions with the World Bank, the International Monetary Fund, the Import-Export Bank, the Inter-American Development Bank and the Federal Reserve Bank, as well as numerous other national and regional financial banks and services. And, three of the counties within the NCR—Fairfax, Arlington and Montgomery—are ranked economically in the top ten in the U.S.

Washington is also one of the world’s most important diplomatic centers. Foreign missions, chanceries, embassies, residences and international organizations and companies are located in the NCR to facilitate interaction with Washington and their home governments, as well as to conduct business with the U.S. federal government and the private sector.

Q. *Why does this region of the country have such unique energy requirements?*

A. This region of the mid-Atlantic U.S. is a heavy user of energy because of its demographics, its critical industries, the dramatic increases in the use of sophisticated technology and energy-dependent equipment, and above all, the fact that it contains the National Capitol Region and all that the NCR implies for the use of power supplies. It is the center of U.S. government and all branches are collocated in the NCR to ensure efficiency and enhance communication.

Within the region lies the largest and most sophisticated military and intelligence headquarters in the entire federal government. Led by the Pentagon, one of the world's largest office buildings, the NCR has extensive power requirements for command, control and communications of our far flung bases and units.

New requirements for the use and increased demand for power have developed and will continue to increase as today's military forces are creating and executing plans based on capabilities that were not available as recently as Operation Desert Storm. Much of this is due to net-centric warfare and the information transfer and sharing that is made available by the Internet. Today, the nation's armed forces have increased use of information, information access and information speed—all of which increases the demands for power in the NCR.

Additionally, the country's military and civilian intelligence infrastructure is centralized in the NCR in government departments and agencies such as the CIA, FBI, NSA, Department of Homeland Security and the Defense Intelligence Agency, all carrying out global missions that require large amounts of power to conduct various types of electric power dependent surveillance that are vital to the security of the nation.

In the private sector, supporting these government activities are more than 4,300 high-technology firms in Virginia alone, 60% of which are located in northern Virginia, which is home to one of the largest concentration of computer communications equipment and semiconductor manufacturing sector companies in the country. The extensive fiber optic cable network serves as the backbone for over half of the world's online Internet traffic.

The National Capital Region imports nearly all of its natural gas and petroleum products via major pipelines that run through the tri-state area. Along with key natural gas transmission pipelines, these pipelines are all part of the region's gas and petroleum distribution network and NCR critical infrastructure. Electric power for these pipelines is an essential part of the network of pumping stations, storage facilities and distribution centers in the NCR.

With the growth not only in the region's transportation sector like the expansion of Dulles International Airport, modernization of Ronald Reagan Washington National Airport and the military airport at Andrews Air Force Base, and Metrorail, but also in the country's national security facilities, such as doubling

the size of Ft. Belvoir and the construction of a new Department of Homeland Security Headquarters, there will be an increased demand in electric power from such government activities. (See Attachment EVB-4 for Metrorail Grid and NCR Airports Locations) Also, part of the NCR transportation critical infrastructure includes ports in Maryland and Virginia.

Q. *Why is a reliable and robust source of electric power a vital component of national security preparedness?*

- A. Loss of power and, in particular, chronic shortages that could be associated with lack of adequate electric transmission capacity to northern Virginia region can have profound impacts on our national security as well as other critical infrastructures. Blackouts and loss of service in the NCR can impact emergency services, transportation, healthcare, building support, food supply and other non-defense components of the federal, state and local governments.

Our basic electric power infrastructure systems are a highly integrated, mutually dependent and a highly utilized set of components that provide our national security programs with vitally needed services and support. These include food and water supply, waste disposal, natural gas, communications, transportation, petroleum products, shelter, medical support and emergency services.

Over the past decade our electric supply system has taken on significantly greater loads (power demands) for our national security requirements in the NCR, until the DOD requirements alone account for over half of all federal electric power use. With the addition of the Department of Homeland Security and additional intelligence agencies, the power demand for national security has grown even higher.

The loss of power can have major negative impacts on national security and the critical operations that take place in the NCR. For example, the national security power requirements in the NCR involve newer and more electrified war fighting and security activities, such as net-centric operations, increased use of sensors, more complex command, control and communications, as well as increased numbers of operation centers.

Since 9/11 there have been tremendous upgrades in the use of electronic security systems that provide integrated security for our military operating centers and critical infrastructure facilities. New installation of electronic security components, such as access controls, surveillance cameras, increased lighting, radio frequency ID tags and other technical and operational intelligence information equipment, all increase our power requirements for these critical infrastructure facilities.

The recent growth in military, security, critical industry and personnel have dramatically increased the amount of electric power needed to assist the various

federal, state and local officials in conducting their NCR-based duties and responsibilities.

Q. ***Why is it so necessary to focus our attention on the national security aspect of electrical power? What vulnerabilities are specific to the national capital region?***

A. The vulnerability of the NCR's power systems evolve, in part, from the threat of terrorism. The various types of terrorist threats against electric power systems include: sabotage, physical assault and disruption of computer networks along with indirect threats to water, personnel, energy, feed-stocks, tampering with process safety and fail safe systems. Tactical threats require a robust power system that will allow the NCR to continue to maintain its national security missions without periodic blackouts.

National security and utility planners in the NCR understand that electricity must be produced and delivered through highly complex technological systems at the instant of demand. The electric systems are constructed and operated to withstand the stresses imposed upon them by nature and by equipment failure. While most utilities are well-prepared to handle outages, they are not capable of reliable performance when there are system problems such as brownouts or blackouts. In an era where interruption as short as a fraction of a second can cause major problems or equipment damage to electronic intelligence, e-commerce and other IT systems, the predicted electric power shortfalls in 2011 could have dire consequences on our national security. Unlike residential and commercial customers who have predictable daily peaks in demand, continuously operating government facilities like operational data centers add more demand to the electric power base load and must have a reliable supply of electricity to carry out important national security functions. While many have backup facilities, they are not designed to address a chronic shortfall in power supply. Since the effective national security functioning of the NCR and its various units are almost totally dependent upon electrical systems, the widespread loss or degradation of power systems that serve clusters of key DOD headquarters, military bases, critical infrastructure assets and major metropolitan areas would have a very detrimental effect on national security. Reliability of the power system is critical.

Q. ***What could be the negative impact and long-term consequences if adequate supplies of electrical power caused energy shortages to this critical national security sector or the various "operations" centers of the NCR?***

A. A power loss scenario for the National Capital Region can be illustrated through a hypothetical. Assume that in July of 2011, a continuing record heat wave stresses the power systems in the PJM region, eventually causing the system to become

critical during the midday period causing some power reductions and, ultimately, causing some rotating blackouts in the NCR. Imagine further that these circumstances repeat themselves and the response of rotating blackouts becomes chronic due to insufficient backbone transmission facilities, which take years to plan and build. These situations could be exacerbated by an additional natural hazard or other failures of generation or transmission facilities. Each time, problems begin occurring in the metropolitan regions—failed traffic signals, traffic gridlock, Metrorail operations, and inability of police, fire and EMS personnel to effectively respond to emergencies, failure of HVAC systems and elevators in high rise buildings and problems in hospitals, schools and other social institutions.

Among critical infrastructures, problems develop at the local civilian and military airports as well as with the rail systems. The metropolitan gridlock moves to the beltway and the interstates causing massive backups. Pipelines and the System Control and Data Acquisition (SCADA) systems that coordinate their operations are down. Water pumping systems in nearby jurisdictions are functioning on emergency power as a stopgap measure. Tremendous volume and power problems cause difficulties with cell phones. There are banking and wire transfer problems. Some of the critical infrastructures have emergency power generators, but many do not.

However, there is another facet of the emergency—the national security impact. The government, civilian and military workforce essentially shuts down. Many federal workers and government contractors cannot get to or from work because of public transportation shutdowns or impassable traffic jams on the region's highways. And, other government employees who rely on electronic equipment to perform their jobs at home are unable to do so because of the power failures in their neighborhoods. Critical personnel remain at their desks but there may be computer operating problems at the various headquarters and intelligence operations and command centers that are tasked with maintaining contact with U.S. military operating forces. The vast net-centric systems for coordinating national defense switch to emergency power, but some of the automated systems are not functioning properly. The array of global intelligence systems with satellite communications are functioning in a degraded mode. The nerve centers of the Washington-based national security apparatus are functioning at a reduced level.

The foregoing scenario describes how we could be at risk without adequate supplies of reliable power.

Q. *Does that conclude your prepared direct testimony?*

A. Yes, it does.