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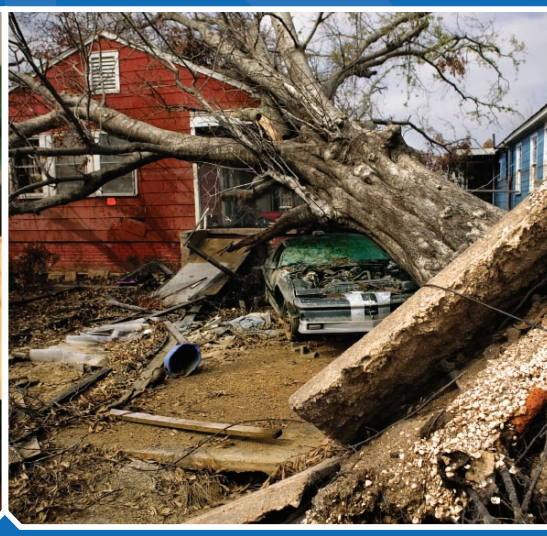
United States
Environmental Protection
Agency

Energy and Water Distribution Interdependency Issues: Best Practices and Lessons Learned

SUMMARY REPORT OF 2005 ENERGY AND WATER DISTRIBUTION EXERCISE



Office of Research and Development
National Homeland Security Research Center

Acknowledgements

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Contents

1.0
Statement of the Problem

Understanding the interdependencies among our nation's 17 critical infrastructures (defined in Homeland Security Presidential Directive/HSPD -7) is critical to sustaining the continuity and resilience of each infrastructure component as well as the collective system. This report discusses the relationship of two critical infrastructures, water and energy, and provides recommendations for minimizing the effects of energy emergencies on drinking water distribution.

The reliance on a constant supply of energy is widely recognized and receives regular coverage in the media. Repercussions from energy emergencies, such as the impacts of the 2003 blackout in the northeastern United States, are commonly understood and well documented (https://reports.energy.gov/BlackoutFinal-Web.pdf). Less understood is the criticality of water and wastewater systems. According to HSPD - 7, an attack or breakdown of the United States critical infrastructure and key resources (e.g., water sector) could cause "catastrophic health effects or mass casualties… affect our national prestige and morale… [or] have a debilitating effect on security and economic well-being."

The following examples demonstrate some of the ways our society and economy depend upon functioning water systems and the interdependency between the water and energy sectors:

- Hospitals, nursing homes, schools, office buildings, restaurants, and other such facilities all require drinking water and wastewater service in order to operate. Water is used for drinking, sanitation, and heating and cooling systems.

- Many manufacturing operations either use water as an ingredient in their processes or rely on wastewater systems to remove and process their manufacturing waste.

- Water is critical to emergency response in many ways. The most obvious is fire fighting. Having ready access to safe water is important in order to provide mass care services and public health services, such as supplying potable water for drinking and ice for preserving food and medicine, during the emergency.

- Clean water and functioning wastewater treatment systems are also necessary for sanitation, preventing the spread of disease among evacuated populations and emergency responders, and the provision of temporary housing.

- Power generation and water infrastructures are significantly interdependent. Drinking water and wastewater cannot typically be processed without energy to run pumps and treatment equipment. Likewise, water is used in many aspects of the energy infrastructure including electricity generation (steam generation to turn turbines) and cooling of generators or other equipment used to provide fuel and power during emergencies.

Essential work has been done in both the private and public sectors to enhance the security and protection of the drinking water/wastewater infrastructure. A key component of such efforts is assessing and hardening vulnerabilities. Some vulnerabilities are completely within the scope and control of the sector, such as site security. However, others are related to sector interdependencies. Questions for planners and decision makers to consider regarding the energy and water relationship in their community include:

- Are the infrastructures (or specific important facilities within each infrastructure) so tightly linked that close coordination and cooperation will be needed to restore both infrastructures? As described earlier, water and energy infrastructures are co-dependent. As a result, it may be necessary to restore these services simultaneously depending on how close this relationship is in a community.

- What facilities/operations within the community require the drinking water/wastewater infrastructure

be brought on-line first before they themselves can be restored? For example, health regulations prevent most facilities, such as schools, hospitals, and nursing homes, from opening if there is no drinking water or wastewater service.

- Who are the critical water customers? Critical customers include those facilities that provide essential services during an emergency or are critical to the function of a community (e.g., hospitals, kidney dialysis centers, industrial users, etc.). These facilities would be given first priority for restoring service.

- What if multiple segments of the drinking water/wastewater infrastructure are affected? It is important to prioritize the internal restoration of the drinking water/wastewater infrastructure if multiple segments are affected at once during an incident. For example, water and wastewater themselves are closely linked; the need for sewer services is less important following a disaster until the water system comes back on-line and water is again flowing into the wastewater system.

To comply with the Bioterrorism Act of 2002, drinking water utilities serving populations of 3,300 or greater had to complete vulnerability assessments (VA) and emergency response plans (ERP) to address those vulnerabilities. These VA's and ERP's should have taken interdependencies into account. To assist water and energy sectors with this effort, U.S. EPA's National Homeland Security Research Center (NHSRC) in partnership with U.S. DOE's Office of Electricity Delivery and Energy Reliability and Public Technology Institute (PTI) held a workshop in 2005 designed to identify best practices and lessons learned from previous crisis incidents that impacted both the energy and water infrastructures.

2.0
Objectives and Summary of the Exercise

On August 17, 2005 local, state, and federal officials and representatives from private industry gathered in Washington D.C. for a half-day scenario-based tabletop exercise and lessons learned workshop regarding a case study of a major energy system disruption, caused by Hurricane Isabel, in the Washington D.C. Metropolitan Area and the resulting effects on the water distribution and supply infrastructure in the area. The exercise was sponsored by U.S. EPA's NHSRC, U.S. DOE's Office of Electricity Delivery and Energy Reliability, and PTI.

Exercise presentations and discussions focused on pre-emergency planning, emergency operation plan implementation, alternative water supply options, and energy and water-related best practices and policy-based options. Exercise participants reviewed actual occurrences from pre-landfall of Hurricane Isabel to several days into recovery and restoration, and actively discussed energy and water issues throughout this defined timeframe. On September 18, 2003, Hurricane Isabel made landfall near Cape Hatteras, North Carolina, as a Category 2 storm with winds near 100 mph. Despite this fairly modest storm classification, over the next 24 hours Isabel caused unprecedented power outages (6.5 million customers) throughout the Mid-Atlantic region.

Participants were briefed on the issues and challenges faced by local, state, and federal agencies and private organizations during response and coordination efforts. Bringing these agencies and organizations together periodically to review the special demands of emergency response and recovery efforts is a unique way to build understanding, trust, and relationships that are essential in the fast-paced operating environment of major disasters. This exercise afforded the participants the opportunity to conceptualize synchronized operations related to priorities, capabilities, and the needs of all partners and customers. A list of participating organizations is provided in Attachment A.

The exercise and facilitated discussions were intended to:

- Provide lessons learned from the 2005 hurricane season related to the energy and water infrastructure.
- Highlight the importance of communications and establishing working relationships across various state, federal, and private organizations in advance of energy and water emergencies as a part of the planning process.
- Provide opportunities to discuss process and coordination efforts with various state and local energy and water authorities in infrastructure assurance to engage them in reliability issues.
- Assess the technical assistance needs of local officials with regard to planning for and responding to an energy and subsequent water supply disruption.
- Provide opportunity for participants to exchange ideas and best practices for dealing with future energy emergencies that affect water supply.

3.0
Key Discussion from Exercise Participants

Hurricanes highlight the unique interdependencies within the water and energy sectors. A better understanding of these interdependencies is needed across all sectors and within the government for the purposes of planning and mitigation, prioritizing restoration, and recovery. This exercise helped advance the degree of mutual understanding of the impacts of a multi-region/state response to a hurricane. Hurricane Isabel challenged the water and energy sector, and this exercise paved the way for improving the effectiveness of response and restoration operations for water and wastewater, power, and natural gas networks. Using the tabletop exercise to guide discussion, workshop facilitators posed the following questions to participants:

- What lessons were learned from Hurricane Isabel?
- What are the water sector's priorities in times of crisis?
- What assistance do local officials and utilities need from state and federal agencies during this type of a crisis?
- How do water utilities currently plan to obtain power during energy emergencies?
- How can the electric utilities do more to help the water utilities?

With respect to lessons learned, participants impacted by Hurricane Isabel indicated that it served as a "wake-up" call for more detailed planning. Although the water and energy sectors were able to recover from Hurricane Isabel relatively quickly because it was a comparatively short-term event, the following were identified as priorities for plan augmentation:

- Staffing:
  - Prepare contingency staffing plans (key personnel were on vacation when Hurricane Isabel struck in August);
  - Cross-train employees and minimize multiple responsibilities for individuals;
  - Prepare for long-term events (staff sustainability);
  - Consider and plan for the needs of employees' families;
  - Utilize Emergency Operations Center (EOC) and resources from other agencies and organizations (i.e., Parks and Recreation Department, trade associations, neighboring jurisdictions, larger utilities) earlier.
- Communications:
  - Redundant communication technologies are necessary (800 MHz radios, amateur radio, cell phones);
  - Develop protocols for regular interagency and interdisciplinary communication during emergencies (to improve communication and coordination among agencies and other responding entities);
  - Enhance timeliness and effectiveness of communication to the public, including alternative methods to communicate emergency measures when standard modes, such as television and radio, are not available due to power loss.

Another key lesson learned from Hurricane Isabel was the need for urban forestry planning and regular tree trimming. One of the main after effects of the hurricane was the number of downed trees and limbs which in turn downed power lines. There was significant discussion about the cost to keep tree limbs trimmed away from power lines. This is a continuing concern for jurisdictions with a large number of older trees throughout the community.

Regarding the water sector's priorities during times of crisis, staffing and communications were again the primary themes of the discussion. Specifically, mobilizing staff resources quickly (who needs to report; where to report; where to respond) and sustaining staff

resources are priorities. For communications, quickly and effectively notifying the public of "do not use" or "boil water" advisories and establishing information outlets, such as call centers, were priorities.

Regarding assistance from state and federal agencies during these types of emergencies, participants indicated that they primarily need quick financial aid. Coordination support, staffing, equipment resources (generators) and supplies (fuel, ice, water), and risk communication assistance were also identified as areas where assistance would be most helpful.

With respect to obtaining power during energy emergencies, there was extensive discussion about back-up generators, including cost, availability, reliability, maintenance, and associated regulatory requirements, such as air quality permitting. Obviously, being able to obtain fuel for emergency generators is critical. Participants shared strategies for ensuring that adequate fuel is available, such as establishing relationships with local as well as out-of-town suppliers, maintaining fuel stockpiles, and utilizing underground storage tanks rather than above ground tanks.

In response to the question of how electric utilities can help water utilities, participants asked that electric utilities (recognizing budget limitations) invest in newer technology (i.e., better transformers, switches, and fuses, bury power lines), increase staff during emergencies for quicker recovery (mutual aid and assistance agreements and MOUs), and participate in local Emergency Operations Centers (EOC) when they are activated. During this part of the workshop, there was discussion regarding the unanticipated consequences of deregulation and DOE's performance standards for utilities, specifically as they related to response and restoration time. It was also noted that electric utilities could prioritize water utilities as critical customers so that they would receive assistance in restoring power supply as soon as possible.

Lastly, each of the questions evoked discussion regarding water storage capacity as well as the importance of mutual aid and assistance agreements and MOUs not only within the sectors, but also among the sectors. After the workshop, the water sector has engaged in a large effort to increase the number of intrastate mutual aid and assistance agreements in the water sector, commonly referred to as Water and Wastewater Response Networks (WARNs). The main resource for this effort has been the "Utilities Helping Utilities" Action Plan that was published by the American Water Works Association (http://www.awwa.org/Advocacy/govtaff/issues/Issue07_Water_Response_Networks.cfm). This document describes the process for establishing WARNs based on the CALWARN and FLWARN models which were the first two WARN programs developed by the water sector.

4.0 Recommendations

Although there are a number of areas for improvement, the overall response and recovery of the water and energy sectors to Hurricane Isabel was successful. Local governments and industry deserve considerable credit for effective planning and preparation as well as tireless efforts of restoration under difficult circumstances. Industry and government worked well together at all levels.

Hurricane Isabel highlighted the unique interdependencies within the water and energy sectors. The storm also underscored the criticality of the energy infrastructure. A better understanding of these interdependencies is needed across all sectors and within the government for the purposes of planning, mitigation, prioritizing, restoration, and recovery. Many participants noted the need to build greater resiliency in the water and energy sectors, which will require diversifying energy resources and investing in new infrastructure.

Analysis of the issues and discussion resulted in the development of the following recommendations from the exercise. Local, state, and federal agencies and industry should evaluate each recommendation to determine which actions are appropriate to implement independently or collaboratively. In considering these recommendations, public and private sector organizations need to gauge the point at which the cost of preparation (planning, stockpiling of supplies, etc.) exceeds the public's willingness to pay for preparation. Similarly, the public needs to be educated on the level of service to expect following an emergency that impacts both energy and water.

Best Practice Case Study – **Miami-Dade, FL**

The Miami-Dade Water and Sewer Department (MDWASD), being in a hurricane zone, has extensive backup power systems and a sophisticated resource management plan. Standby power systems (dual fuel to the extent possible) are installed at major wellfields, water and wastewater treatment plants, and major wastewater pumping stations. Rules now require that new wastewater pumping stations at or above 100 gallons/day average flow be furnished with in-place standby power systems. Additionally, at the largest MDWASD water treatment plant, "spinning reserve" is utilized to ensure the maintenance of adequate system pressure in the event of a power failure. Under this approach, at least one standby power generator and one direct diesel-driven high service pump are operated continuously in preparation for power failures. On the approach of significant rain events, additional units are preemptively started in anticipation of a power failure. At the other treatment plant complex, five remote storage tank/pumping stations facilities are located in the system. These help maintain pressure in the event of a power failure at the main treatment plant high service pump station. Also, as an alternative to the "spinning reserve," MDWASD is planning on a system of elevated water storage tanks to maintain pressure during power failures (http://www.miamidade.gov/wasd/home.asp).

Best Practice Case Study – **San Francisco, CA**

An independent power generation system is a system that can supply power independent of the electrical grid. This supplied power will assist with the distribution of water when electricity services are disabled. Independent systems can utilize any number of alternative power sources, such as solar, wind, and hydroelectric.

The San Francisco Public Utilities Commission (SFPUC) Wastewater Enterprise (WWE) installed a 1.95 MW cogeneration plant in 2003 at its Southeast Plant. This unit uses waste gases to produce electricity and heat, which is used onsite. When running, the cogeneration plant can provide approximately 40% of the electricity needs of the facility (http://sfwater.org/).

Recommended areas for action:

- Pre-plan personnel and other resource management and allocation during emergency response and recovery phases. The ability to obtain resources proved difficult on many fronts (ice, food, housing, generators, etc.). Industry, state, and local organizations should identify resource requirements and pre-negotiate contracts for emergency supplies. Consider pooling resources and preparing contingency staffing plans.

- Better understand what state and federal governments can deliver and when. Local, state, and industry personnel were not fully aware of the resources that the federal sector had to offer to support preparation and response. Develop and distribute a catalogue of federal resources available to responders and key points of contact.

- Communication is key. Develop and pre-establish protocols for regular interagency and interdisciplinary communication during emergencies and ensure redundant communication systems.

- Improve fuel supply for response and recovery. Fuel supply solutions must be identified to ensure that adequate supplies are strategically positioned for use. Pre-negotiated fuel supply contracts or adequate stockpiles should be considered.

- Establish or improve upon mutual aid and assistance agreements. Initial results have proven successful between cities and counties, as well as between energy and water sectors.

Best Practice Case Study – **San Diego, CA**

The City of San Diego's Alvarado Water Treatment Plant utilizes solar panels to produce approximately 20 percent of the plant's power. The Alvarado photovoltaic installation was built under a power purchase agreement (PPA) with SunEdison, North America's largest solar services company. Under the agreement, SunEdison installed the photovoltaic system at no cost to the city allowing residents to gain the benefits from clean, solar energy while avoiding an estimated $6.5 million worth of installation costs (http://www.sandiego.gov/water/gen-info/history.shtml).

5.0
Additional Resources and References

In response to HSPD-7 and the National Response Plan, the federal government has developed several tools that states, municipalities, and stakeholders may find useful when developing their emergency operation plans or responding to an incident.

EPA Resources

The following EPA Web page, **http://cfpub.epa.gov/safewater/watersecurity/home.cfm?program_id=8**, provides a comprehensive list of emergency response tools that can be used to help with emergency incident planning. A table on this Web page identifies the intended users for each tool provided on the page. This list includes drinking water and wastewater utilities as well as "other government and private sector entities, such as public health and law enforcement officials, emergency responders, laboratories, and technical assistance providers."

Tools and technical assistance focused more on water security and antiterrorism measures can be found on the following EPA Web page: **http://cfpub.epa.gov/safewater/watersecurity/tools.cfm.**

Information regarding EPA grant opportunities for certain organizations to provide training, technical assistance, and tool development for water security can be found at this EPA Web page: **http://cfpub.epa.gov/safewater/watersecurity/financeassist.cfm**.

EPA also provides a search engine on its Web site that allows a user to find training courses, meetings, workshops, and webcasts that are sponsored by EPA and other organizations involved in water security. The search engine is found at: **http://cfpub.epa.gov/safewater/watersecurity/outreach.cfm**.

DOE Resources

The Department of Energy's Office of Electricity Delivery and Energy Reliability offers the following information, lessons learned, and tools to assist all levels of government and industry with emergency planning and preparedness.

Florida State's Energy Emergency Response to the 2004 Hurricanes: **http://www.oe.netl.doe.gov/docs/fl2004energy.pdf**.

The Office staff worked with DOE's Emergency Operations Center, Department of Homeland Security, the Federal Emergency Management Agency, and other groups to respond to the massive power outages caused by Hurricane Isabel: **http://www.oe.netl.doe.gov/hurricanes_emer/isabel.aspx**.

The State Energy Program (SEP) is the only federally funded, state-based program administered by the U.S. Department of Energy that provides resources directly to the states for allocation by them. More information about this program, administered by the National Association of State Energy Officials, can be found at: **http://www.naseo.org/sep/default.htm**.

The Infrastructure Security and Energy Restoration (ISER) Division of the Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability leads the federal government's effort to ensure a robust, secure, and reliable energy infrastructure. Information can be found at: **http://www.oe.energy.gov/infrastructure.htm**.

EPA Partner Organizations

EPA works closely with many partners on guidance and best practices for water security and other interdependency issues, however two were key participants in this exercise: the American Water Works Association (AWWA) and the Association of Metropolitan Water Agencies (AMWA).

AWWA is an international nonprofit scientific and educational society dedicated to the improvement of water quality and supply. Founded in 1881, AWWA is the largest organization of water supply professionals in the world. Its more than 60,000 members represent the full spectrum of the water community: treatment plant operators and managers, scientists, environmentalists, manufacturers, academicians, regulators, and others

who hold genuine interest in water supply and public health (**www.awwa.org**).

AMWA is an organization of the largest publicly owned drinking water systems in the United States. The association was formed in 1981 by a group of general managers of metropolitan water systems who wanted to ensure that the issues of large publicly owned water suppliers would be represented in Washington, D.C. Among other services, AMWA serves as the U.S. EPA-designated liaison between the water sector and the federal government on critical infrastructure protection and operates the Water Information Sharing and Analysis Center (WaterISAC) and the Water Security Channel (WaterSC) (**www.amwa.net**).

DOE Partner Organizations

In addition to PTI, the following partner organizations of the Department of Energy offer topical briefs, technical papers, and other tools regarding energy assurance and energy security.

The National Association of State Energy Officials (NASEO) is the only nonprofit organization that represents the Governor-designated energy officials from each state and territory. The organization was created to improve the effectiveness and quality of state energy programs and policies, provide policy input and analysis, share successes among the states, and be a repository of information on energy issues of concern to the states and their citizens (http://www.naseo.org).

The National Association of Regulatory Utility Commissioners (NARUC) is a non-profit organization founded in 1889. Its members include the governmental agencies that are engaged in the regulation of utilities and carriers in the fifty States, the District of Columbia, Puerto Rico, and the Virgin Islands. NARUC's member agencies regulate the activities of telecommunications, energy, and water utilities (http://www.naruc.org/displaycommon.cfm?an=1).

The National Conference of State Legislatures (NCSL) is a bipartisan organization that serves the legislators and staffs of the nation's 50 states, its commonwealths, and territories. NCSL provides research, technical assistance, and opportunities for policymakers to exchange ideas on the most pressing state issues. NCSL is an effective and respected advocate for the interests of state governments before Congress and federal agencies (http://www.ncsl.org/public/govern.htm).

Founded in 1908, the National Governors Association (NGA) is the collective voice of the nation's governors and one of Washington, D.C.'s most respected public policy organizations. NGA provides governors and their senior staff members with services that range from representing states on Capitol Hill and before the Administration on key federal issues to developing policy reports on innovative state programs and hosting networking seminars for state government executive branch officials. The NGA Center for Best Practices focuses on state innovations and best practices on issues that range from education and health to technology, welfare reform, and the environment. NGA also provides management and technical assistance to both new and incumbent governors (http://www.nga.org/portal/site/nga/menuitem.cdd492add7dd9cf9e8ebb856a11010a0/)

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6.0
Attachments

Attachment A: Participating Organizations in the 2005 Energy and Water Distribution Workshop

American Water

American Water Works Association

Arlington County Energy Office

Arlington County Water

Association of Metropolitan Water Agencies

Cincinnati Fire Department

Computer Sciences Corporation

DC Energy Office

Fairfax County

Fairfax Water

Federal Technical Support Working Group

Greater Cincinnati Water Works

Johns Hopkins University Applied Physics Laboratory

Maryland Department of the Environment

McMunn and Associates

Metropolitan Washington Council of Governments

Pittsburgh Water and Sewer Authority

Public Technology Institute

University of Louisville

U.S. Department of Energy

U.S. Department of Homeland Security

U.S. Environmental Protection Agency

Washington Aqueduct

Washington Suburban Sanitary Commission

DOE WORKSHOP

Workshop Evaluation
Customer Satisfaction Survey: OMB #2090-0019 Expires 3/31/06

1. With what type of organization are you affiliated (check as may as apply)?

a.	Regulated facility or business = 2	e.	Trade association = 1
b.	Industry sector = 2	f.	Nonprofit organization = 5
c.	Consulting company = 2	g.	School or university = 1
d.	Government = 18	h.	Other _____

EFFECTIVE COMMUNICATION/CLARITY OF INFORMATION
On a scale of 1 to 6 where 1 is very dissatisfied and 6 is very satisfied please indicate your level of satisfaction with the following:

Readability

2. a. Readability (*i.e., flow, writing style, and presentation of concepts*) of the workshop materials?

6 Very satisfied = 8	3 Somewhat dissatisfied
5 Satisfied = 14	2 Dissatisfied
4 Somewhat satisfied = 2	1 Very dissatisfied
	Don't know = 5

b. COMMENT:
-Not really any handouts- PPT was excellent
-Good Visuals
-Supplemental handouts of comparison documents would have been helpful.
-Nothing Handed out
-No materials
-No handout materials

3. a. Understandability of the workshop materials (*i.e., the ability of the product to convey the information in a way that is easy to grasp and comprehend*)?

6 Very satisfied = 5	3 Somewhat dissatisfied = 1
5 Satisfied = 18	2 Dissatisfied
4 Somewhat satisfied = 4	1 Very dissatisfied
	Don't know = 1

b. COMMENT:
-I thought more emphasis would be on energy.
-Concise format -well focused
-Our objectives were not very clear, lack of attendance from electric utilities degraded meeting severely.
-Objectives not clear
-Could have used Electric Utilities; if certain water utilities were prepared to present their lessons learned rather than asked to chime it, there may have been more discussion.
-Consider providing an agenda & reviewing the plan for the meeting prior to starting the actual workshop.

4. a. Accuracy of the **technical information** (*knowledge regarding the subject matter*) included in the workshop materials?

6 Very satisfied = 8	3 Somewhat dissatisfied = 1
5 Satisfied = 11	2 Dissatisfied = 1
4 Somewhat satisfied = 7	1 Very dissatisfied
	Don't know = 1

b. COMMENT:
-Some info was excellent, other info a bit dated or not accurate.
-This did not present other than high level material - already understood
-Facilitators could have had more water knowledge; consider including more industry reps.

Organization and Clarity

5. a. How satisfied are you with the organization (presented in a logical order) of the Meeting?

6 Very satisfied = 13	3 Somewhat dissatisfied =
5 Satisfied = 11	2 Dissatisfied = 1
4 Somewhat satisfied = 4	1 Very dissatisfied
	Don't know =

b. COMMENT:
-No agenda or clear objective- table top did not cause new info to be discovered.
-Could have gone Fed- State- Local

6. a. How clearly (plain and evident) is information communicated in this Meeting?

6 Very satisfied = 10	3 Somewhat dissatisfied = 1
5 Satisfied = 14	2 Dissatisfied = 1
4 Somewhat satisfied = 4	1 Very dissatisfied
	Don't know

b. COMMENT:
-Good interplay and support by presenters.
-Main presenters were excellent.

Other Recommendations:

7. We welcome any other comments you have about this workshop.
-Coverage of the energy side was superficial and lack of utility participation was disappointing.
-Presentation used altered/fake phot of hurricane Isabell on the "Hot Wash" slide.
-Made some good contacts. What other deliverable could have been developed? Identify and define R & D requirements.
-Consider incorporating an actual exercise into the workshop. I think it would allow the sectors to develop an even better understanding of each other.
-Is there any research ongoing on types of trees to recommend for home owners to plant? i.e. Some trees fall/break greater then others. Some trees grow a little shorter.
-More data about other power problems at other utilities could be useful.
-Excellent-Brought it down to local area.

AWARENESS AND UNDERSTANDING

8. a. How satisfied are you that this workshop meets your need for information about the issue/subject matter?

6 Very satisfied = 6	3 Somewhat dissatisfied = 1
5 Satisfied = 12	2 Dissatisfied = 1
4 Somewhat satisfied = 9	1 Very dissatisfied

b. COMMENT:
-Good to get later dependant entities together. Next time need to have electric utilities in the works next time.
-Need to link info from "natural disasters" to " un-natural disasters" (i.e. terrorist incidents)
-could have benefitted with more lead-time
-The information presented was very helpful- need more information on planning for an "unplanned" emergency.
-Not sure what the end result is- develop a report that goes where???

9. a. How satisfied are you that the information presented in this workshop increased your awareness of the issue/subject matter?

6 Very satisfied = 8	3 Somewhat dissatisfied = 2
5 Satisfied = 11	2 Dissatisfied = 1
4 Somewhat satisfied = 5	1 Very dissatisfied
	Don't know = 1

b. COMMENT:
- Good level representation — helps in reintroducing essentials in energies.
-Already knew a fair amount on this issue

10. a. Do you expect to refer to the information from this workshop again?
Yes = 24 No = 5

b. Why or why not?
-Took some lessons learned back to modify our energy planning.
-I'd like a copy of the PPT for future use.
-EPA emergency Response Exercise CD
-Report back to supervisor
-I often work with all utilities, this info will be helpful
-Internal planning for technology development
-Practical first-hand info from actual situations was featured
-Concern for little new information learned
-Met a networking contact on an issue I may need to confront
-Member of our Emergency Mgt coordinating committee can use these.
-It doesn't fall under my scope of work, but it helps me understand what my co-workers do.
-re emphasis on vulnerabilities (critical) that have been discussed but not addressed.

10. a. Would you recommend this workshop to others?
Yes = 25 No = 4

b. Why or why not?
-Useful to take a few minutes and focus
-For those outside the DC area useful / for those here sufficient representation there. No need to repeat.
-Yes on two levels Policy makers at one; Operational level
-Very informative
-IT was very important information and a networking opportunity
–Practical first hand info from actual situations was featured.
-Some will benefit, others won't
-Networking Opportunity
-Would recommend including a balance of representatives from both sectors
-Down to earth and useful
-It makes you understand all that is involved in a disaster, natural or man made
-Very well presented. Is elevated critical information to public safely and critical information.

Attachment C: Exercise Sponsors

EPA's National Homeland Security Research Center

The National Homeland Security Research Center (NHSRC) develops and delivers reliable, responsive, expertise and products based on scientific research and evaluations of technology. NHSRC's expertise and products are widely used to prevent, prepare for, and recover from public health and environmental emergencies arising from terrorist threats and incidents. Research and development efforts focus on five primary areas:

- **Threat and Consequence Assessment** investigates human exposure to chemical, biological, and radiological contaminants to define dangerous levels of these contaminants and establish protective cleanup goals.
- **Decontamination and Consequence Management** focuses on decontamination of buildings and outdoor environments, as well as the safe disposal of contaminated materials.
- **Water Infrastructure Protection** is charged with protecting the nation's drinking water sources and distribution systems and ensuring the safety of wastewater collection, treatment, and disposal procedures.
- **Response Capability Enhancement** works directly with emergency responders and local governments to provide tools and information needed to make informed decisions in the event of an attack.
- **Technology Testing and Evaluation** evaluates technologies that show potential for use in homeland security applications. These evaluations are used by water utility operators, building owners, emergency responders, and others to make informed decisions when purchasing security technology.

For additional information, visit NHSRC's website at **www.epa.gov/nhsrc**.

DOE's Office of Electricity Delivery and Energy Reliability

The Department of Energy's Office of Electricity (OE) Delivery and Energy Reliability's mission is to lead national efforts to modernize the electric grid, enhance security and reliability of the energy infrastructure, and facilitate recovery from disruptions of energy supply. Program efforts focus on three primary areas:

- **Research and Development**
  Plan, implement, and evaluate a portfolio of electric delivery and infrastructure security technology projects, visions, R&D roadmaps, public-private partnerships, technology transfer and commercialization plans, and education and outreach strategies. Manage research, development, field-testing, and demonstration projects for "next generation" electric delivery and infrastructure security technologies. Develop, implement, and maintain a cyber security program to assist the Nation's energy sector.

- **Permitting, Siting, and Analysis**
  Conduct analysis of the physical, regulatory, and institutional barriers that interfere with the efficient and secure operation of electric transmission and distribution systems. Conduct analyses to identify major electric delivery constraints ("bottlenecks"). Coordinate with national, regional, state, and local organizations and utilities to develop effective solutions and assess alternatives increasing the reliability and efficiency of electric market operations. Coordinate with the Power Marketing Administrations (PMAs). Evaluate and, if appropriate, approve applications for Presidential permits for new electric transmission lines across U.S. international borders. Evaluate and, if appropriate, approve applications to export electricity from the U.S. Collect, analyze, and disseminate annual data on U.S. international electricity trade. Participate in bilateral and trilateral discussions with Canada and Mexico related to electricity trade and regulation.

- **Infrastructure Security and Energy Restoration** Manage DOE's activities related to the national critical infrastructure protection program in coordination with DHS, FERC, and others. Conduct analysis of energy infrastructure vulnerabilities to physical disruptions and recommend preventative measures in coordination with DHS and others. Provide technical and operational support to other federal, state, and local agencies in planning for and responding to energy emergencies. In accordance with the National Response Plan, conduct Emergency Support Function Twelve (energy) operations in support of the Department of Homeland Security during a declared National or State Emergency or National Security Special Event.

For additional information, visit OE's website at **http://www.oe.energy.gov/about/384.htm.**

Public Technology Institute

The Public Technology Institute (PTI) is a national member supported organization based in Washington, DC. As the only technology organization created by and for cities and counties, PTI works with a core network of leading local government officials– the PTI membership – to identify opportunities for technology research, share best practices, offer consultancies and pilot demonstrations, promote technology development initiatives, and develop enhanced educational programming. Officials from PTI member governments participate in councils and forums that address specific technology areas. Through a corporate partner program with leading technology companies, and partnerships with federal agencies and other governmental organizations, PTI shares the results of these activities and the expertise of its members with the broader audience of the thousands of cities and counties across the U.S.

For additional information, visit the PTI web site at www.pti.org.

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