AmericanLifelinesAlliance

A public-private partnership to reduce risk to utility and transportation systems from natural hazards and manmade threats

Protecting Our Critical Infrastructure: Findings and Recommendations from the American Lifelines Alliance Roundtable

FEMA

National Institute of BUILDING SCIENCES

American Lifelines Alliance

The American Lifelines Alliance (ALA) is a public-private partnership project funded by the Federal Emergency Management Agency (FEMA) of the Department of Homeland Security and managed by the Multihazard Mitigation Council (MMC) of the National Institute of Building Sciences (NIBS). The ALA's goal is to reduce risks to lifelines – the essential utility and transportation systems that serve communities across all jurisdictions and locales — from all hazards. To do so, it facilitates the development, dissemination, and implementation of planning, design, construction, rehabilitation, and risk-management guidance and encourages use of this information to improve the performance and reliability of new and existing critical infrastructure.

The ALA's key stakeholders are lifeline operators and the communities they serve, standards development organizations, and engineering and risk-management professionals. The ALA provides a forum to address current industry and community needs and crafts unique partnerships to work across lifelines systems. ALA products either are incorporated in national consensus standards documents or are disseminated to key industry stakeholders through relevant associations and industry publications.

The ALA seeks partners in the public and private sectors to collaborate with the ALA in identifying and supporting mutually beneficial projects. In addition to FEMA and NIBS, current partners are Pacific Gas and Electric Company, Radian/ROHN, US Geological Survey, and Bureau of Reclamation.

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The ALA is pleased to have organized and conducted this Lifelines Roundtable as part of its ongoing effort to develop guidance for lifelines owners and operators and promote industry-wide efforts to reduce the risk to the nation's utility and transportation systems from natural hazards and manmade threats.

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Executive Summary

The October 5, 2004, Lifelines Roundtable conducted by the American Lifelines Alliance (ALA) with funding from the Federal Emergency Management Agency (FEMA) served as a forum for open and candid discussion of the common needs of the infrastructure community to reduce risks from natural hazards and manmade threats and possible opportunities for cooperation and collaboration in addressing those needs. Invited to participate in the roundtable were approximately 50 representatives of the water, wastewater, electric power, oil and gas pipeline, transportation, and telecommunications lifelines sectors.

Lifeline stakeholders benefit from networking

The roundtable served as an effective mechanism for bringing owners, operators, and policymakers together and demonstrated their eagerness to learn from each other to the benefit of their individual systems and sectors.

Practical guidance is needed

The lifeline owners, operators, and policymakers who participated expressed their desire to better understand the risks to their systems and asked for practical guidance on identifying and implementing well-balanced, multihazard risk-management alternatives. Those participants from lifeline systems functioning in a competitive environment preferred industry-wide guidance that would result in a "level playing field" for risk-management planning and implementation. Given the infrequency of severe natural or manmade hazard events and the substantial investments often necessary to implement mitigation measures, the benefits of hardening facilities, increasing system redundancy, and preparing for rapid repair and recovery must be defined in terms of return on investment to both the lifelines organizations and the communities they serve.

Lifeline interdependencies must be addressed

Interdependencies among and within lifeline sectors are increasingly recognized as a significant cause of delay and disruption in delivering lifeline services during and after a hazard event. If reliability is to improve, a better

understanding of how loss of service in one sector affects recovery of service in other sectors is needed.

The public and their political representatives need to be more aware of the risks to lifelines and the implications of failures

The lifelines community needs an active voice to educate the public and their political representatives about the risks to lifelines from natural hazards and manmade threats, the consequences of losses due to these events, the long-term benefits of risk reduction, and the barriers to implementation of risk-reduction measures. Without such information, the public tends to be unwilling to pay to achieve reasonable levels of lifeline performance. The majority of roundtable participants supported efforts to improve communication and increase public and policy-maker awareness including the development of educational materials and effective information delivery mechanisms (e.g., workshops).

Additional roundtables are needed

Roundtable participants generally agreed that additional forums should be convened to focus on major issues including terrorism as a catalyst for all-hazards risk reduction, inter-sector assessment of dependencies, interactive exercises involving all lifeline sectors including medical and human services, National Infrastructure Protection Plan coordination

Chapter 1
INTRODUCTION

1.1 Organization of the Roundtable

The need to protect the nation's critical infrastructure from natural hazards and manmade threats has become increasingly important in recent years, and a wide variety of organizations, both public and private, are addressing various aspects of the problem. In recognition of the variety of efforts under way and the differences between lifelines systems, the American Lifelines Alliance (ALA) convened a roundtable on October 5, 2004, as a mechanism for bringing together a broad spectrum of individuals responsible for various aspects of the array of lifeline systems to discuss individual and common needs and identify potential opportunities for cooperation and collaboration in meeting those needs.

With the assistance of FEMA and the ALA Project Team, selected individuals and organizations were invited to participate in the one-day roundtable held at the American Institute of Architects Headquarters in downtown Washington, D.C. Participation was limited to approximately 50 lifeline stakeholders representing utility operators and owners, industry associations, and federal and state governments. An effort was made to maintain a balance between policymaker and practitioner participants in the lifeline sectors of water, wastewater, electric power, oil and natural gas pipelines, transportation (highway, transit, rail, and maritime), telecommunications, and related fields of interest like cyber security and emergency management. In addition, representatives from both large and small lifeline systems were invited. (See Appendix A for a list of roundtable participants.)

All lifeline systems provide products or services that are transferred through networks that often cross multiple legal and jurisdictional boundaries.

The lifelines represented by the roundtable participants share many common features. The most common and essential feature shared by all is that they are distributed systems, not isolated facilities. All lifeline systems provide products or services that are transferred through networks that often cross multiple legal and jurisdictional boundaries. Most lifeline systems contain components that provide for some form of collection or storage and processing of their product. Most systems require public rights of way and easements for the components of the system that transmit and distribute their products. All also involve administrative, maintenance, and control functions that depend on physical and cyber security.

1.2 Roundtable Objective

To help shape and influence future policy and practices with respect to lifelines reliability guidance by providing key cross-sector industry and governmental players with credible information, loss reduction strategies, and networking opportunities by bringing together key policymakers and industry managers for a day-long roundtable.

The roundtable objective was articulated in the invitation package sent to potential participants. The participants and the organizations they represented, along with the ALA, share an overarching goal of improving lifeline system reliability for all hazards and threats. By comparing and contrasting policies and practices among the various lifeline systems represented, the ALA sought to identify areas where improvements are needed in current knowledge or practices used to improve lifeline reliability. The ALA also intended to foster awareness of the benefits of an ongoing exchange of ideas among lifeline system stakeholders. Initiating networking across lifeline sectors is considered to be an effective means for shaping and influencing lifeline practices and polices that address common needs and possibly act as the basis for pursuing a common action agenda.

1.3 Roundtable Format

The roundtable agenda (see Appendix B) was structured to provide lifeline representatives with opportunities to discuss current issues and challenges with their counterparts in public agencies and private industry in small groups, in facilitated plenary sessions, and on an individual basis during breaks. For the small-group discussions, each group selected a participant to summarize the group's discussions in subsequent plenary sessions and another participant to take notes on the discussion using paper flipcharts. At least one ALA Project Team member also was assigned to each group to serve as a facilitator and a supplemental recorder.

In organizing the roundtable, the ALA followed the approach it has used in the past to identify and develop improved guidance for lifeline systems % namely to focus on current industry practices, actions that will lead to improvement of existing practices, approaches to implementing those actions, and opportunities for cooperation among lifeline system owners and operators, industry groups, and regulatory agencies that represent the public interest.

The roundtable began with introductory presentations intended to welcome the participants and set the direction for the day. Following these presentations, the participants were divided into five separate groups organized by broad lifeline sectors -- namely, water and wastewater, electric power, oil and natural gas pipelines, transportation (highways, transit, freight rail, ports), and multiple lifeline interests (telecommunications, process control systems, insurance, emergency management, and research).

The theme for the morning session was "Looking In" and the goal was to develop an understanding of the most important vulnerabilities of the various lifeline sectors. During these sessions, each group was asked to answer a series of questions formulated to generate:

1. A prioritized list of hazards considered most significant,

2. A list of tools employed to reduce vulnerabilities, and

3. A list of factors that directly and indirectly influence a lifeline system owner's ability to identify or implement vulnerability-reduction activities.

"Top three wishes" for near-term were established

The discussions leading to the development of these three lists served as the basis for each group to identify its "top three wishes" for near-term changes (within the next 3 to 5 years). The morning concluded with a plenary session during which each group presented its lists and a facilitated discussion during which common themes were identified.

In the afternoon, small groups again were formed but, in this case, the participants of each group were representatives of different lifeline sectors. The theme for the afternoon session was "Looking Out" and the goal was to identify:

1. Common needs,
2. Issues or concerns that serve as drivers for common needs,
3. Key leverage points for influencing improvements in policies and practices for lifeline systems, and
4. What initial "next steps" are needed to take advantage of the identified leverage points.

Again, each group reported its findings in a plenary session in which a facilitator assisted in identifying common themes from the group presentations.

Following the roundtable, notes were extracted from the flipcharts developed by each small group's recorder. These notes are summarized in Appendix C. In many cases, particularly for the summary of the afternoon breakout sessions, similar responses were combined. In some cases, the notes recorded on the flipcharts were intended to remind the designated group speaker of key points of discussion and, as a result, some translation of the more abbreviated notations was required based on the supplemental notes taken by ALA Project Team members. Such translations were minimized in order to maintain an accurate representation of the information presented by the roundtable participants.

Chapter 2
ROUNDTABLE FINDINGS AND CONCLUSIONS

2.1 FINDINGS

2.1.1 Natural Hazards and Manmade Threats Considered Significant

Not surprisingly, the roundtable participants identified as significant a variety of natural hazards and manmade threats that reflects the diversity of lifeline geographical distribution and physical and operational characteristics. These hazards and threats generally fell into general categories as indicated below:

Natural Hazards:

- Severe weather including hurricanes, extreme wind, atmospheric icing, drought, el Niño, tornados, floods, extreme snowfall, global warming, and extreme low temperature.
- Geological hazards including earthquakes, mud slides, earth movement, volcanoes, landslides, subsidence, and tsunami.
- Other hazards including wild fires, grease, trees, corrosion, roots, animal disturbance, geomagnetic storms, and pipe-soil interaction.

Manmade Hazards:

- Accidents including hazardous material spills, chemical contamination, right-of-way encroachment, product release, dig-in damage, and buried utility interaction.
- SCADA[1] attacks.
- Interdependencies involving transportation, communication, information technology, collateral damages, and electric power.
- Management including staff reductions, lack of a clear chain of command, "rules" of communication, inconsistent policies, and lack of coordination.
- Terrorist attack involving blast and biological, chemical, and radiological attacks.
- Vandalism including physical destruction and sabotage.
- Public attitude including resistance to new construction and perception/understanding of risk.

[1] Acronym for *supervisory control and data acquisition*, a computer system for gathering and analyzing real time data. SCADA systems are used to monitor and control a plant or equipment in industries such as telecommunications, water and waste control, energy, oil and gas refining and transportation.

- Policy inconsistencies including "rules of game" changes and economics.
- Aging or inadequate components.
- Operation and maintenance practices.

It is interesting to note the number and diversity of hazards broadly categorized as "manmade" as well as the mention of interdependencies with other lifeline systems; management issues related to policy, staffing, budget, and communications; and the public's resistance to new construction and misperception or lack of understanding of risk.

The hazards identified as most significant by the lifeline sector groups are summarized below. The assignment of priority was highly dependent on the variation in exposure to hazards among lifeline systems and historical experience with specific types of hazard.

Hazards and Threats of Greatest Significance

System Type	Natural Hazard Priority	Manmade Threat Priority
Water and Wastewater	Flooding	Accidental releases and SCADA attacks
Electric Power	Severe weather and earth movement	Vandalism, sabotage, and terrorism (cyber and physical)
Oil and Natural Gas Pipelines	Earthquake	Third-party damage (dig-ins and encroachments)
Transportation	Flooding	Accidents (pre-9/11) and terrorism (post-9/11)
Multiple Lifelines including telecommunications	Extreme wind	Third-party damage (dig-ins, encroachments)

For natural hazards, all lifeline sector participants identified earthquake as a significant natural hazard; however, it was given highest priority only by those representing oil and natural gas pipelines sector. With respect to other natural hazards, at least three sectors listed as high-priority hazards flooding, hurricanes, severe winter storms (extreme icing and or snowfall), and earth movement (landslides, mud slides, and subsidence).

If accidents are considered to include unintentional chemical release or discharge, third-party damage and other events caused by improper operation (e.g., incorrect system shutdown or start-up procedures, failure to ensure equipment is in safe condition prior to commencing maintenance or repair activities), this category of manmade threat was identified as the most

significant by all lifeline sectors except electric power (which did not assign priority).

In ranking the hazards and threats, only the transportation system sector group drew a distinction between the pre-September 11, 2001 (accidents) and post-September 11 (terrorist attack) distinction.

2.1.2 Tools Available to Help Reduce Vulnerabilities

Available tools identified by the roundtable participants generally fall into one of four general categories:

- Recommendations, guidelines, and standards;
- Software for modeling system operation or simulating system response;
- Management policies and practices; and
- Intelligence gathering and management procedures.

Recommendations, guidelines, and standards were generally considered to be tools for use in hardening assets against the effects of both natural hazards and manmade threats. Guidelines mentioned specifically were the Risk Assessment Monitoring – Water (RAM-W™) and Vulnerability Self Assessment Tool (VSAT™) methodologies, which are used for security assessment in the water and wastewater industries, and the recommendations of a joint United States-Canadian task force following the 2004 Northeast blackout.

The ability to model system response, primarily with computer-based software, was identified as an important tool by most lifeline sectors. Also mentioned was the use of geographic information system (GIS) technology to integrate geospatial information regarding a system; its customers, and potential hazard zones.

Effective management policies and practices were identified as tools for reducing vulnerability by providing the support needed for consistent risk management and for facilitating effective communication with the public, which can improve the public's understanding of risk-management issues and maximize a lifeline system owner's ability to mobilize the public as additional "eyes and ears" for monitoring lifeline rights-of-way and facilities.

Tools related to the gathering and managing of intelligence included direct collection of intelligence through system

monitoring, sharing of intelligence information through Information Sharing and Analysis Centers (ISACs), and information protection (e.g., information technology security).

2.1.3 Impediments to Reducing Vulnerability

The barriers to implementing various actions to reduce vulnerability generally were considered to relate to:

- Lack of resources,
- Difficulties in communicating risk-management issues,
- Lack of appropriate tools, and
- Lack of adequate threat information.

Resource concerns were one of the primary issues raised during the roundtable

Resource concerns were one of the primary issues raised during the roundtable with all lifeline sector groups identifying some type of resource constraint. The resource issues identified were largely related to funding availability and prioritization of available funds, especially for lifeline systems that operate in a competitive market environment, although attracting and maintaining sufficient human capital also was noted as a constraint. All groups recognized that additional funding is required, whether from the federal government or through increased fees to users or customers, in order to take actions to achieve improved reliability, especially for new initiatives to reduce risks from terrorism. Tied to this recognition that additional funds are needed are concerns within various private lifeline sectors regarding potential adverse impacts on competitive balances should it be necessary to raise additional funds through increases in usage fees or product rates.

Impediments to effective communication also were identified by all lifeline sector groups. These issues were related primarily to difficulties in educating or informing decision-makers and the public about risk identification, prioritization, and management. Of specific concern is the potential for events to result in reactionary responses that may be inappropriate in a risk-management context.

Lack of cooperation also was noted in private sector interaction with governmental agencies

It was noted that the lack of appropriate technical tools was an impediment. Emphasized was the need for tools with sufficient technical sophistication to assist in addressing system interdependencies and in prioritizing risk-reduction measures.

Some lifeline sectors identified lack of information on security vulnerabilities as being important. Specific issues mentioned

related to the lack of access to threat information, the lack of regional threat assessments, and the lack of data to support evaluations of the effectiveness of available countermeasures.

Another issue mentioned as a barrier to reducing vulnerability was uncertainty with respect to changing local, state, and federal requirements and regulatory enforcement mechanisms.

2.1.4 Impediments to Effective Risk Management

Factors identified as impediments to effectively managing risks fell into five categories:

- Regulation,
- Management policies and practices,
- Economics,
- Interdependencies, and
- Social factors.

The regulatory factors mentioned primarily relate to difficulties in working with regulatory bodies in a cooperative fashion, especially when multiple regulating agencies share jurisdiction. Other impediments cited include conflicting regulations, concern over possible additional regulation, and a regulatory bias against cooperating with lifeline system owners. Lack of cooperation also was noted with respect to private sector interaction with governmental agencies in general and with respect to difficulties in sharing or communicating risk information to both government agencies and other lifeline systems without compromising security. It was noted that there appears to be a lack of leadership in the political arena to support legislation aimed at improving reliability by reducing legal barriers to mutual cooperation within regulatory and oversight agencies.

Few incentives exist for investing in risk-management activities

Although certain management policies and practices were identified as tools useful for reducing vulnerability, some policies and practices also were identified as impediments. Specifically mentioned as impeding vulnerability reduction was the lack of a consistent, long-term proactive risk management culture. For example, it was pointed out that it is not uncommon for post-emergency management decisions to be made unilaterally and often without sufficient information to justify those decisions. Other issues related to loss of financial

and human capital through retirement and staff reductions (particularly where consolidation has occurred in the private sector) and poor asset management practices.

It was noted that there are few incentives for investing in risk-management activities

Economic impediments mentioned related to competition between funding priorities for security enhancement and other risk-management needs including those related to natural hazards and operational system improvements. Related to the competition for limited funds is the lack of available methods to assess cost versus benefits in the use of those funds. It was noted that there are few incentives for investing in risk-management activities, especially when such investments do not result in a "level playing field." Also identified as an impediment was the lack of balanced approaches to risk management that can encompass the broad range of potential hazards within the framework of clearly defined responsibilities and prioritized actions to improve reliability. Associated with the need for a balanced risk management approach is the need for clearly defined objectives that can be used to gauge the scope and, ultimately, the success of a risk management program. For example, it was pointed out that substantial federal funds are being directed toward counterterrorism measures in airports in contrast to rail transportation. It was questioned whether this is reasonable in light of the fact that more people go though Penn Station in New York City during a single rush hour than go through O'Hare Airport in Chicago in 2-1/2 days.

Several lifeline sector groups identified system interdependencies as impediments based on the fact that a significant interruption in electric power supply, communications, fuel delivery, etc, can have a major, perhaps catastrophic, impact on the performance of lifeline systems that depend upon those resources. Improvements are needed in the ability to rapidly and efficiently respond to disasters, especially those that affect multiple interdependent lifeline systems. The lack of rapid exchange of critical information to affected parties and poor mechanisms for coordinated response were identified as key impediments.

Social factors identified were related to difficulties in communicating with the public, particularly with respect to the basis for risk-management decisions.

2.1.5 Near-term Changes Desired

Responses to the question about what the lifeline sector groups wish would occur over the next three to five years varied from being very specific (e.g., the oil and natural gas pipelines sector had a specific "number one" wish for implementation of the national 811 call system for notification of planned excavation near pipeline right-of-ways) to more general (e.g., the transportation sector's wish for balanced prioritization of resources based upon realistic assessment of human threats and natural hazards). Not all the lifeline sector groups could come to agreement on the top three wishes and all groups identified many more than three wishes. Among the wishes mentioned by more than one lifeline sector are the following:

- Better defined national performance standards for normal operations and security (e.g., the electric power group supported federal adoption of the North American Electric Reliability Council reliability standards).

- Better ways to assess and address interdependencies whether intermodal within a lifeline sector (e.g., rail and shipping) or cross-sector (e.g., electric power and communication) before, during, and after disaster events.

- Federal funds to support lifeline security that match performance standards and incident consequences with incentives to recover investments.

- Better databases, and access systems, for assessing, classifying, and disseminating threat information.

- Development of a "security culture" within utilities and a "problem-solving" mindset within governmental regulatory oversight agencies.

- Consolidated and coordinated environmental and safety regulations.

2.1.6 Common Needs

The roundtable participants identified a variety of needs related to resource management, guidelines and standards,

interdependencies, and public education.

The resource management concerns identified include the need for:

- Federal funding of federally imposed mandates with maximum flexibility in the use of those funds,
- Guidelines and standards that clearly define when sufficient measures have been implemented based upon cost versus benefit considerations, and
- Means to obtain and retain technically qualified personnel.

Concerns related to guidelines and standards focus on the need for:

- Clearly defining responsibilities for addressing potential terrorist threats among the lifeline organizations and federal, state, and local governments;
- Specific guidance on translating threat alerts to specific actions on the part of lifeline organizations;
- Guidelines on vulnerability assessment methodologies that prioritize the appropriate actions to address identified vulnerabilities; and
- Guidelines and standards for operating secure information-sharing networks including SCADA systems.

Several needs were identified that relate to the fact that understanding of the vulnerability and response of a particular lifeline system often depends on the delivery of services or material from other lifeline systems. Damage to liquid fuel pipeline systems that reduces gasoline and oil supplies and results in a significant impact on land, air, and water modes of transportation was cited as an example. Participants indicated that a means to account for these interdependencies in assessing vulnerability and in developing preparedness strategies is needed as are mechanisms for communicating and transferring technology among lifeline systems and fostering trust between lifeline systems that may be business competitors.

The need to educate both the public and their elected representatives with respect to key risk-management issues was

identified by many participants. Among topics to be addressed is the degree to which risks can be reduced, the costs associated with risk-reduction measures, prioritizing investments among operation and maintenance upgrades, and reducing risks from natural hazards and manmade threats.

There is a need to educate both the public and elected representatives in risk-management issues

Funding, information sharing, and consistent performance standards were identified by all roundtable participants as common needs. To meet these needs they asked for tools that will help them evaluate expenditures, prioritize use of funds, and increase their ability to communicate complex technical information to the communities they serve. They also are looking for strong champions to promote lifeline community needs as an important national priority in the context of other national needs.

Underlying the common needs identified during discussions was the roundtable participants' desire to maintain and improve the quality of lifeline service. Most of the common needs identified during the roundtable reflect the participants' belief that:

- Customers want good service but do not want to pay more for it.
- There is lack of political will to move key legislation forward.
- Competing entities that need to share information and cooperate do not trust one another.
- Lifeline owners and operators are concerned about legal and financial liability, anti-trust violations, and being found negligent.
- The division of responsibility between government (federal, state, local) and lifeline owners for identifying and handling terrorist threats is not clearly defined.
- Lifeline owners, agencies, and lifeline sectors do not communicate well with one another.
- The current regulatory culture says "no" first and provides little direction.

- A means (national plan) for efficiently and consistently prioritize resources is lacking.

No consensus was reached at the roundtable concerning which considerations serve as drivers for the needs expressed or will serve as catalysts for coordination, both within general lifeline sectors and among different lifeline sectors.

2.1.7 Key Leverage Points for Facilitating Change

Historically, major disasters are the strongest impetus for actions to improve the reliability of lifeline systems. After major events, the public usually demands that action be taken to prevent similar events in the future. Similarly, costs related to damage, service interruption, or legal liability claims often prompt demands for changes to be made to prevent similar consequences in the future. Even in areas where there has been no initiating event, fears of adverse consequences, real or perceived, can be factors to motivate change.

Recognizing the role interdependencies play reinforces the importance of cross-sector cooperation.

Another key leverage point identified by the participants is the degree of understanding regarding potential consequences and effectiveness of risk-management practices. For example, recognizing the role of interdependencies reinforces the importance of cross-sector cooperation. Similarly, redundancy is a well-recognized means to improve system resiliency and measures used to manage natural hazard risks can be valuable in developing strategies for manmade threats.

Unfortunately, the public's attention span with respect to lifelines issues is far shorter than the time it takes to identify and implement necessary improvements. Therefore, education of lifeline community stakeholders is necessary to maintain the impetus for realistic and constructive actions that will improve performance in future events. At the same time, lifeline systems should be ready to take advantage of future events. Several actions were suggested that can be generally categorized as fostering cooperation, speaking with a common voice, and taking advantage of current and future events as learning opportunities. A basis for cooperation among various lifeline sectors was defined by the participants as being related to system interdependencies, shared needs, and improved dialog between public and private sector entities.

Part of improved cooperation is the need to speak with a common voice in promoting a balanced all-hazards approach to

risk management. One suggestion was to rely on a nationally recognized organization that could credibly represent multiple lifeline sectors.

The roundtable participants recognized that the Department of Homeland Security (DHS) is in an evolutionary mode. It is defining its multifaceted role as convener, enabler, facilitator, advisor, coordinator, and educator. The participants also recognized that the lifelines community needs to act within the context of the DHS National Infrastructure Protection Plan (NIPP) and the National Response Plan (NRP). In this context, it was suggested that there are opportunities to work with DHS on approaches that consider measures to reduce vulnerability from terrorism as part of ongoing programs that address natural hazards and other operational risks.

Taking advantage of the opportunities presented as a result of future disaster events requires preparation on the part of lifelines systems to improve the likelihood that changes in policies and practices will result. These actions may involve educating stakeholders, including political and regulatory interests, about realistic needs and expectations; drafting suggested changes in regulations that can be promoted following an event; and preparing to rapidly assess financial needs for implementing measures to reduce vulnerability following a future event.

Specifically, the roundtable participants identified a variety of next-step options:

- Speaking with a common voice, contact and educate Congress and key congressional committees about crafting new terrorism initiatives that will have collateral benefits (e.g., past civil defense actions or Y2K successes had benefits beyond their primary purposes).

- Establish effective public-private partnerships and dialogs built on trust with administrative Departments and regulatory agencies, including states, and with professional trade organizations.

- Request explicit guidance from regulatory agencies (a "force-the-issue" approach).

- Encourage dialogue among lifeline sectors and identify synergies between lifeline groups, perhaps using an

organization with national focus (such as the ALA) to help take advantage of best practices.

- Promote a coordinated all-hazards approach through the DHS Information Analysis and Infrastructure Protection (IAIP) Directorate, FBI Terrorism Task Force, and FEMA based on the fact that security, natural hazards, and terrorism all relate to ensuring public safety and well-being.

- Improve the public's understanding of vulnerability.

- Resolve potential constraints to reducing vulnerability related to concerns regarding liability exposure, anti-trust constraints, sharing of propriety information, and loss of funding.

- Leverage interdependencies between lifeline sectors to influence policies and practices that build on common needs while appreciating sector differences.

- Work to assure that financial incentives are tied to any new requirements in a national critical infrastructure protection plan.

2.2 CONCLUSIONS

The roundtable clarified lifeline sector needs and identified areas where action is warranted with respect to issues of utility and transportation system reliability. Two broad areas of particular importance relate to:

Guidance **–** What should be done, by whom, by when, and how?

Communication **–** How can a common understanding be achieved among system owners and operators, the general public, regulatory agencies, and politicians? What do we know and, equally important, what do we not know?

The roundtable discussions revealed that all sectors benefit from having a "level playing field." This means having common and fair guidelines and standards appropriate for the specific characteristics and needs of each lifeline system. Such guidance must recognize that improving security and reducing

the impact from natural hazards and manmade threats are all part of ensuring public welfare. Guidelines and standards should acknowledge that decreasing system vulnerability is one measure to be considered in combination with system redundancy and rapid response measures, recognizing that the time and intensity of future disasters are uncertain and that future terrorist activity may be inevitable.

When hazard assessment tools and mitigation measures are developed, their implementation falls into the realms of politics, law, and finance within both the public and private sectors. Between the relatively brief and intense periods of awareness immediately following disasters, long-term and continuous education and preparation are essential to assure that beneficial plans become reality when awareness peaks. Each educational effort should provide business and governmental leaders with specific actionable information to justify investments of time and money in lifeline safety and reliability. Key to these activities is creating a sense of trust among those stakeholders who share a desire for safe and reliable operation of the lifeline systems on which communities depend.

It was generally agreed that other roundtables should be held to focus on resolving key issues raised in this roundtable. Topics suggested for future roundtables include:

- Terrorism as a catalyst for all-hazards integration for risk reduction;
- Inter-sector assessment of dependencies;
- Interactive exercises involving all lifeline sectors and including medical and human services;
- National Infrastructure Protection Plan coordination and implementation; and
- Analysis of post-disaster lessons learned.

Unplanned but fortuitous benefits can be derived from conducting roundtables. For example at this roundtable, the discussion of the implementation of the 811 system between the pipeline sector and the Federal Communication Commission representative resulted in a positive update on a multibenefit solution for all lifeline sectors that have buried transmission/distribution components.* A sustainable strategy for improving lifeline reliability needs more of these synergistic approaches.

*On March 10, 2005, the Federal Communications Commission adopted the 811 Order.

Chapter 3

ROUNDTABLE RECOMMENDATIONS FOR ACTION

When asked what "next steps" should be taken, many roundtable participants indicated that it was time to "quit talking and starting doing." Many also voiced frustration at having participated in repetitive general discussions related to implementation of new security measures. Another concern expressed by many participants was that many past actions were immediate reactions, or overreactions, to the most recent event and were not necessarily well thought out. Despite these concerns, the participants recommended that steps be taken to:

- Promote coordination, perhaps through a nationally recognized organization that can credibly represent lifeline system interests, to address specific implementation issues in the context of the National Infrastructure Protection Plan (NIPP) and the National Response Plan (NRP) (e.g., how should responsibilities be delegated among federal, state, and local governments and the private sector).
- Identify individual benefits to lifeline operators and the public using success stories (e.g., grants for projects that demonstrate multihazard integration to meet performance goals, similar to past initiatives taken by FEMA's Mitigation Division).
- Use lifelines interdependencies[1] as a basis for bringing regional and national stakeholders together to identify synergies and build coalitions that improve reliability and promote rapid recovery.
- Improve performance and recovery standards and other tools (including software) to assess costs for various hazard scenarios (including accounting for interdependencies) by breaking issues into manageable pieces and incorporating lessons learned from past events (e.g., using the experience that Department of Energy has gained collecting impact data after disasters).

Unfortunately, time did not permit a discussion of what priorities should be assigned to these steps and no priority should be implied by the order in which these suggested actions are presented.

It was noted that future roundtable meetings focusing on these recommendations for action could provide a mechanism for presenting findings and communicating these findings to a broad set of stakeholders.

The ALA is pleased to have organized and conducted the October 2004 Lifelines Roundtable as part of its work for FEMA and its ongoing role in developing lifeline guidelines and standards and promoting industry-wide efforts to resolve the critical issues in achieving reliability for the nation's utility and transportation systems.

(Footnotes)

[1] In response to the discussion of and importance assigned to interdependencies by the roundtable participants, the ALA has initiated an assessment of the role of utility and transportation system interdependencies in the response and recovery from the 2004 Florida hurricanes. Working with a team of researchers from the Virginia Polytechnic Institute and State University, the ALA expects to post a report on this project on its website in early 2006.

Appendix A

LIST OF ROUNDTABLE PARTICIPANTS
(Lifeline Sector Represented)

Co-chairs

David I. Maurstad, U.S. Department of Homeland Security, Federal Emergency Management Agency, Mitigation Division, Washington, D.C.

Brent H. Woodworth, IBM Crisis Response Team, Woodland Hills, California (MMC Chair)

Participants

John Baals, U.S. Bureau of Reclamation, Denver, Colorado (multiple lifelines/public sector)
Roger Bohnert, U.S. Department of Transportation, Research and Special Programs Administration, Washington, D.C. (transportation)
Terry D. Boss, Interstate Natural Gas Association of America, Washington, D.C. (oil and gas pipelines)
David Brinker, Radian ROHN Industries, Inc., Peoria, Illinois (multiple lifelines/telecommunications)
Frank Calcagno, Federal Energy Regulatory Commission, Washington, D.C. (electric power)
Jim Caverly, U.S. Department of Homeland Security, Washington, D.C. (multiple lifelines/public sector)
Bob Chipkevich, National Transportation Safety Board, Washington, D.C. (oil and gas pipelines)
Cade R. Clark, National Association of Water Companies, Washington, D.C. (water/wastewater)
Ben Cooper, Association of Oil Pipelines, Washington, D.C. (oil and gas pipelines)
Mark Crowell, Department of Homeland Security, Federal Emergency Management Agency, Washington, D.C. (multiple lifelines/public sector)
John L. Dagg, Southern California Gas Company, Los Angeles, California (oil and gas pipelines)
Paula Dannenfeldt, Association of Metropolitan Sewerage Agencies, Washington, D.C. (water/wastewater)
Brian M. Frazer, Environmental Protection Agency, Water Security Division, Washington, D.C. (water/wastewater)
Richard L. Gerhart, Department of Transportation, Federal Transit Administration, Washington, D.C. (transportation)
John A. Gerner, Department of Transportation, Federal Highway Administration, Washington, D.C. (transportation)
Jeffrey Goldthorp, Federal Communications Commission, Federal Office -- Network Reliability and Interoperability, Washington, D.C. (multiple lifelines/telecommunications)

Judy Guilliams-Tapia, Government Accounting Office, Physical Infrastructure Team, Washington, D.C. (oil and gas pipelines)
Daniel Haas, Government Accounting Office, Natural Resources and Environmental Team, Washington, D.C. (electric power)
Alan Hais, Environmental Protection Agency, National Homeland Security Research Center, Washington, D.C. (water/wastewater)
David A. Harris, National Institute of Building Sciences, Washington, D.C. (NIBS staff)
JoAnn A. Haveland, Human Technology, Inc., McLean, Virginia (roundtable facilitator)
Claret M. Heider, National Institute of Building Sciences, Washington, D.C. (NIBS staff)
Michael E. Hokana, Department of Transportation, Maritime Administration, Washington, D.C. (transportation)
Douglas G. Honegger, D. G. Honegger Consulting, Arroyo Grande, California (oil and gas pipelines)
Greg Hull, American Public Transportation Association, Washington, D.C. (transportation)
Joy O. Kadnar, Department of Transportation, Engineering Services, Security and Emergency Response, Washington, D.C. (oil and gas pipelines)
Leon Kempner, Bonneville Power Administration, Vancouver, Washington (electric power)
Tom Kevorkian, Pipeline Research Council International, Inc., Arlington, Virginia (oil and gas pipelines)
Edward M. Laatsch, Department of Homeland Security, Federal Emergency Management Agency, Emergency Preparedness and Response, Washington, D.C. (FEMA Senior Project Officer for ALA)
Lou Leffler, North American Reliability Council, Princeton, New Jersey (electric power)
George J. Lonquist, FM Global, Johnston, Rhode Island (multiple lifelines/private sector/insurance)
Andrew Lu, American Gas Association, Washington, D.C. (oil and gas pipelines)
Marty H. Matheson, American Petroleum Institute, Washington, D.C. (oil and gas pipelines)
James K. Murphy, Michael Baker, Jr., Inc., Alexandria, Virginia (water/wastewater)
Stuart Nishenko, Pacific Gas and Electric Company, San Francisco, California (electric power)
Roy Ramani, Water Environmental Research Foundation, Alexandria, Virginia (water/wastewater)
Diane Raynes, Government Accounting Office, Natural Resources and Environment Team, Washington, D.C. (multiple lifelines/research)
Paul H. Reistrup, Transportation Consultant, McLean, Virginia (transportation)
Paul Robb, Federal Energy Regulatory Commission, Washington, D.C. (electric power)
J. Alan Roberson, American Water Works Association, Washington, D.C. (water/wastewater)
William U. Savage, U.S. Geological Survey, Menlo Park, California (electric power)
Richard Sloan, Pima County Wastewater Management, Tuscon, Arizona (water/wastewater)
Gil Sperling, Pipeline Research Council International, Inc., Arlington, Virginia (oil and gas pipelines)
Daryl Lee Spiewak, Brazos River Authority, Waco, Texas (multiple lifelines/emergency management)

James A. St. Pierre, National Institute of Standards and Technology, Gaithersburg, Maryland (multiple lifelines/public sector)
Joseph Steller, National Institute of Building Sciences, Washington, D.C. (NIBS staff)
Keith Stouffer, National Institute of Standards and Technology, Gaithersburg, Maryland (multiple lifelines/public sector)
Kristina Tanasichuk, American Public Works Association, Washington, D.C. (public utility operator)
Gary Vine, Electric Power Research Institute, Washington, D.C. (electric power)
Maria Vorel, Department of Homeland Security, Federal Emergency Management Agency, Washington, D.C. (multiple lifelines/public sector)
Stuart D. Werner, Seismic Systems and Engineering Consultants, Oakland, California (transportation)
Evan D. Wolff, MITRE, McLean, Virginia (multiple lifelines)
Laurence W. Zensinger, Dewberry, Fairfax, Virginia (multiple lifelines)
Chris Zerby, Federal Energy Regulatory Commission, Washington, D.C. (oil and gas pipelines)

Appendix B

ROUNDTABLE AGENDA

AMERICAN LIFELINES ALLIANCE (ALA) ROUNDTABLE

October 5, 2004, 8:30 am to 5:00 pm

American Institute of Architects Headquarters Board Room

1735 New York Avenue NW, Washington, D.C.

FINAL AGENDA

TIME	WHAT	NOTES
8:30 – 9:00 am	**Continental Breakfast**	
9:00 – 9:10 am	**Welcome** **Co-Chair Opening Remarks**	David Harris *(NIBS President)* David Maurstad *(FEMA Mitigation Div. Acting Director)* and Brent Woodworth *(IBM Crisis Response Team Manager and MMC Chair)*
9:10 – 9:15 am	**Desired Outcomes/Agenda Review**	JoAnn Haveland, *Facilitator*
9:15 – 9:45 am	**Getting Connected: Introductions** • Name • Where you work & your role • Why you're here	Roundtable Participants
9:45 – 10:00 am	**BREAK**	
10:00 – 11:25 am	**Looking In: Where Are We Vulnerable**	Lifeline Tables • Water/wastewater • Electric Power • Pipelines • Transportation • Multiple Lifelines

TIME	WHAT	NOTES
11:25 am – 12:15 pm	**Lifeline Report Outs**	Each table takes 10 minutes to report out
12:15 – 12:30 pm	**Large Group Debrief** • What are your reactions? • What common themes emerged?	
12:30 – 1:30 pm	**Lunch**	
1:30 – 1:45 pm	**Luncheon Presentation:** **American Lifelines Alliance Protecting Our Critical Infrastructure**	Edward Laatsch *(FEMA Senior Project Officer for ALA)*
1:45 – 2:45 pm	**Looking Out: What Needs to Happen?**	Participants at mixed-lifeline tables
2:45 – 3:00 pm	**Break**	
3:00 – 3:50 pm	**Table Group Report-Outs**	Each group takes 10 minutes to report out
3:50 – 4:15 pm	**Large Group Debrief** • What are your reactions? • Similarities/Differences? **Group consensus** on one action that can be taken	
4:15 – 4:25 pm	**Next Steps/Meeting Evaluation**	
4:25 – 4:50 pm	**Table Group Report Outs**	
4:50 – 5:00 pm	**Closing Remarks**	Co-chair Woodworth
5:00 pm	**Adjournment**	

Appendix C

PLENARY MEETING NOTES

Table C-1 Hazards Identified as Significant by Lifeline Sector
(Numbers indicate priority if assigned; bullets indicate sector cited hazard as being significant)

Hazard Types	Water and Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
NATURAL HAZARDS					
Severe Weather					
Hurricanes	●	●		●	
Tornados	●				
Extreme winds		●			**1**
Flooding	**W1 WW1**		●	**1**	
Ice Storms / winter storms / snow		●		●	**2**
Drought	●				
Global warming	●				
El Nino	●				
Geological					
Earthquakes	●	●	**1**	●	●
Landslides/mudsSlides	●	●	●		
Subsidence/earth movements	●	●	●		
Tsunamis		●			
Volcanoes	●	●			
Other					
Forest fires/wild fires		●	●		
Accidents (sabotage/discharges)	●				●
Roots	●				
Grease	●				
Animal disturbance (birds, wildlife, burrowing rodents)		●			
Trees		●			
Geomagnetic disturbance (solar storm effects on bulk system transformers)		●			
Corrosion			●		

Hazard Types	Water (W) and Wastewater (WW)	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
MANMADE HAZARDS					
Non-Terrorist					
Accidents	●			**1 (pre 9/11)**	
Chemical release	**W1 WW1**				
Physical destruction (vandalism and sabotage)	●	●			●
Third party damage (dig-ins, utility interaction, right-of-way encroachment)			**1**		**1**
Resistance to new construction ("not in my back yard" syndrome)			●		
Public perception / understanding of risk			●		
Operating and maintenance practices		●			
Clear lines of responsibility (communication/coordination)		●			
Management cutbacks		●			
Policy inconsistencies ("rules of game" change, economics)			●		
Aging and/or inadequate infrastructure		●			
Terrorism					
Physical attack		●	● **(LNG* only)**	**1 (post 9/11)**	
Blast					
Contamination (chemical, biological, radiological)	**W4**				
Wastewater generated by decontamination	**WW2**				
SCADA attacks	**W2 WW3**				
Interdependencies					
Transportation (collateral damage)	●		●		
Communication	●		●		
Cyber		●			●
Electricity	**W3 WW4**		●	●	
Psychological threat (ineffective communication)	●				

* Liquified natural gas.

Table C-2 Tools Available to Reduce Vulnerabilities Indicated by Lifeline Sector

Tool	Use	Water / Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
Recommended Practice, Guidelines, and Standards						
Risk Assessment Monitoring–Water (RAM –W™)	• Coordination of activities within sector	●				
Vulnerability Self Assessment Tool (VSAT™)	• Improve physical security	●				
2004 blackout report recommendations	• Vegetation management • Tools • Authority • Training • Cyber security • Information sharing		●			
Design standards and guidelines	• Asset hardening • System wide/ cross sector	●	●	●	●	●
System Modeling and Simulation						
River spill	• Developing or refining mutual aid Agreements	●				
Pipeline net	• Training • Surveillance and sensor needs • Coordination of activities within sector	●				
Analytical tools for networks and subsystems	• Assessment • Developing countermeasures		●		●	
Contingency analysis computer models	• Assessing “what if’s” • Identify what can be done?		●	●		
Geographic information systems (GIS)	• Information integration		●			
Management Policies and Practices						
Management practices and tools	• Risk management • Maintain state of good repair		●	●	●	
Emergency exercises	• Emergency management materials		●	●	●	

Tool	Use	Water / Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
	• Mutual aid • Assess response and recovery • Basic employees • First responders					
Communications	• Public education • Right-of-way eyes and ears • 811 One Call • Public awareness		●	●	●	
Redundancy	• Backup control centers		●	●	●	
Enforced maintenance practices	• Maintain state of good repair		●			
Automated Security Survey and Evaluation Tool	• Standards design; Association of Metropolitan Sewerage Agencies/Water Environment Research Foundation research	●				
Skills Information Management System	• Policies and procedures – material delivery, internal controls	●				
Gathering and Managing Intelligence						
DHS sharing information	• Information Sharing and Analysis Centers (ISACs)					●
Technologies and monitoring	• Obtain intelligence				●	
Information protection	• Information technology security		●			
Rapid and reliable hazard information and education	• Seismic • Weather • Flooding • Terror threats		●			●
Other						
Rate-relief for security and reliability concerns	• Public Utility Commissions/Federal Energy Regulatory Commission/National Association of Regulatory Utility Commissionersl		●			

Table C-3 Factors Impeding Tool Use to Reduce Vulnerability by Lifeline Sectors

Impediments to Use of Tools	Water / Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
Cost or Resource Concerns					
Cost/availability of funding; money (limited resources for preparedness and response)	●		●	●	●
Competitive environment (who pays and how to re-coup)		●		●	
Competing priorities	●				
In-house expertise needed; attracting and maintaining human capital		●	●		
Losing focus of what is important (guns vs. maintenance; realistic threats = policy for balanced risk); more efficient use of limited resources (see cost factor above)		●			
Communication					
Social factors – open society				●	
Translation of issues to decision makers; attitude and company management; liability concerns	●		●		●
Education of priority of industries (awareness) (relative priorities) is a policy issue; how to handle nonregulated industries		●			
Public awareness				●	
Reactionary response				●	
Lack of Technical Tools (models, guidelines, standards)					
Sophistication of technology; technology transfer	●		●		
Difficulty prioritizing; risk priorities (perception, stance); inadequate vulnerability assessment tools	●		●		●
Interdependencies of sectors – one influences others		●			
Lack of Information					
Knowledge of and access to training	●		●		
Evaluative data on available countermeasures	●		●		
Access to sensitive information because of security clearances; DHS does not share information	●				
Lack of data or quality of data (regional threat increase is better; ability to analyze data accurately); information transfer and sharing	●		●		
Other					
Missing authorities (or dominance of some) jurisdictional issues; regulatory certainty		●	●		
Environmental constraints		●			
Lack of enforcement, free market environment		●			
Integrity, management standards			●		

Table C-4 Impediments to Using Tools

Impediments to Using Tools	Water / Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
Regulatory					
Fear of regulation by public utility commissions, etc.	●	●			
Difficulties in sharing or communicating risk information without compromising security (general vs. specific threats)	●				●
Legislation related to funding (exclusion of privates; mandates or not)	●	●			●
Need "high standards" with industry input for calibration (with federal back-up)		●			
Multiple layers of often conflicting regulatory agencies/requirements			●		
Regulatory agencies/requirements biased to always say "no" first			●		
Government acknowledges the importance of critical infrastructure but does little to work cooperatively to improve system capacity, reliability, or resiliency			●		
Management Policies and Practices					
Management attitude in maintaining a consistent and long-term culture of proactive risk management and reduction			●		
Reduction and loss of human capital through retirement, staff reductions, and difficulties in attracting high-quality replacements			●		
Asset management	●				
Uninformed unilateral decisions				●	
Wrong responses to events				●	
Utility consolidation (primarily private utilities)	●				
Foreign ownership in relationship to expertise and liabilities	●				
Life and health lifelines take a priority					●
Lab capacity	●				
Networked infrastructure (remote water supplies; combined storm and sanitary systems)	●				

Impediments to Using Tools	Water / Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
Economic					
Competition between security and other needs of utilities	●				
Difficulty of assessing cost/benefit	●				
Lack of incentives for improvement (need a level playing field)	●	●			
Aging systems (replacement costs or "modernizing" to meet inspection/safety regulations)	●		●		
Interdependencies Among Different Lifeline Systems					
Intermodal nature of transportation				●	
Complexity of lifeline interdependencies and limited assessment tools	●				●
Public health network evolving	●				
Testing of mutual support				●	
Social					
Customer relations	●				
Risk communication (i.e., not including stakeholders and operators)	●			●	
Urban growth	●				
Threat targets are selected on social impact					●

Table C-5 Lifeline Sector Three Wishes for Next 3-5 Years

(Numbers indicate priority if assigned; bullets indicate sector cited the item as desirable.)

Three Wishes	Water / Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
Federal funds to support utility security (matching performance standards and incident consequence)	1			3	
Better threat information (database of ongoing threats) and information accessibility (uniform system for assessing, classifying, and disseminating information)	2				
Better defined national performance standards for normal operations and security	3			●	3
Better way to assess and address interdependencies; intermodal and cross sector coordination before/during/after events or disasters	4			1	1
Instituting a security culture in utilities	●				
Federal adoption of North American Electric Reliability Council reliability standards		1			
Improved threat (terrorism) intelligence and natural hazards		2			
• Actionable intelligence; response must match threat/vulnerability and better balance response social/political		●		2	
• Information sharing (globally with legislation to limit liability)		●			2
Prioritization of resources (public and private) based on realistic threat assessment and natural hazard assessment		3		●	
• Quantification of interdependencies; cross-sector global vulnerabilities assessment		●			

Three Wishes	Water / Wastewater	Electric Power	Oil/Gas Pipelines	Transportation	Multiple Lifelines
• What are acceptable risks?		●			
• Incentives to re-coup investments – public/private partnerships		●			
Implement 811			1		
Develop a "problem solving" mindset within governmental and regulatory oversight agencies			2		
Environmental/safety regulation coordination			3		
Adequate funding for new technology			4		
Develop alternate fuels delivery system			5		
Public appreciation for industry design requirements, regulatory oversight, reliability and safety record			●		
Measure return on investment				●	

Table C-6 Common Needs Identified in Mixed-Sector Groups

Common Needs	Group 1	Group 2	Group 3	Group 4	Group 5
Political power	●				
Money; financing; funding; priority of resources with government support without excessive intervention	●	●	●	●	●
Information; data sharing; enough information in threat alerts to meet needs; variety of regulatory agencies coordination and cross sector, especially electric, like the Transportation Security Administration has begun and as ALA has done in its system performance assessment guidelines; incident / information sharing	●	●	●	●	●
Justification of need (information to support ability to communicate); education in events and risks (perceived vs real); communications especially during crisis; public confidence in action plans without offering details of vulnerabilities/security plans	●	●	●		●
Target standard (consistent performance standard) – realistically; attainable; reliability (baseline standards and criteria harmonize across federal and industry/private sectors, especially for power); assure reliability of lifelines – balancing needs by common assessment tools and standards to address vulnerability (will consumers agree with costs and benefits)	●	●	●	●	●
Development of allies; cross sector communication; technology transfer	●	●		●	
Better technology and tools	●	●			
Protected information sharing network	●			●	
SCADA standards	●			●	
Mechanism to prioritize expenditures; prioritization (balance between resources and risk); risk perception – balanced treatment; conflicting regulatory standards	●	●	●		●
Interdependencies (assessing and addressing, e.g., preparedness defining relationships and plans); cross sector vulnerability assessments with resource sharing		●		●	
Rewards/punishment			●		
Holistic approach – one solution creates another			●		
Human capital					●

Table C-7 Desires for Common Needs Identified by Mixed-Sector Groups

Common Need Drivers	Group 1	Group 2	Group 3	Group 4	Group 5
Maintaining quality and service; interface effectively in terms decision makers understand; lack of knowledge / awareness by decision makers; reliability of lifelines	●	●		●	●
Public concerns; second guesser fears – customers want good service but don't want to pay	●		●		
Improving quality and service; research and development to apply to everybody (pyramid hierarchy?)	●	●			
Political will; Focus application of resources; lack of key legislative activity	●	●		●	
Trust among competing entities; ability to share information and emergency response post-event operations/recovery to a point of a recovery forecast especially for power – emergency planning councils	●	●			
Liability; negligence	●		●		
Responsibility; take limited resources in area of greatest risk; culture change from avoiding responsibility/risk	●	●	●		
Discuss interdependencies across sectors; create cross-sector group to implement and operationalize key steps once a national plan is developed (Information Sharing and Analysis Centers or cross-sector council)		●		●	
Need for national plan to identify performance measures				●	
Funding lacking					●
Standards needed					●

Table C- 8 Key Leverage Points to Facilitate Change Identified by Mixed-Sector Group

Key Leverage Points	Group 1	Group 2	Group 3	Group 4	Group 5*
Recognize interdependencies • Collaborative plans among lifelines / collaborative funding of programs; • Table top exercises / sector coordination	●	●			
Public opinion/outcry; Congressional decision-makers/Government Accountability Office; Congress, key committees, administration; regulatory and funding agencies (federal and state -- Environmental Protection Agency Water Security Division, DHS IAIP and FEMA, FBI terrorism task forces; increase awareness on front-end; public perception and/or • Educate opinion leaders and the public • Form alliances – build coalitionsPrivate/public dialogue	● ● ●	● ●		●	
Fear of Risk(s) • Build coalitions • Create tools to better assess risks; and guidance/standards and codes; how do you prove the negative – focusing on failures not successes – quantify/prioritize risks for the limited resources • Increase redundancy	● ● ●	●	●		
Events; series of minor crises or a wake up call from a major crisis		●	●		
Regulations = chink in armor; oversight organization (legislative community, Inspector Generals)		●	●		
Difference in natural/manmade?		●			
Organization hot buttons (e.g., fear of litigation, liability, loss/gain of funding)			●		

* Group 5 had no notes on this question.

Table C-9 Steps to Make Use of Leverage Points

Making Leverage Points Reality	Group 1	Group 2	Group 3	Group 4	Group 5
Create common mindset – mission; piggyback on a related issue (e.g., decision-makers) multihazards;	●	●			
Build coalitions abound interdependencies; (e.g., environmental, development, green/industrial combo); gather decision-makers together in the same room; educational campaign/encourage greater dialogue between private/public sectors	●	●	●	●	
Build on common needs – appreciate divergent needs; engaging unbiased groups of experts; security is a part of safety (add terrorism as a part of an all-hazards approach); encourage trust between sectors, DHS and other government entities; experts needed across all lifelines with DHS involvement (possible lead) and cooperation at federal/state/local levels to incorporate terrorism response in industries used to dealing with natural disasters	●	●	●	●	●
Take advantage of best practices			●		
Tie financial incentives to any new plan			●		
Write (or approach/lobby) Congress with a common voice (build new terrorism on collateral benefits and past civil defense successes)			●	●	
Major events (2004 Madrid bombings) shift money; natural/other events are driving policies/practices – reaction to most recent events gets attention			●	●	●
Request guidance from regulatory agencies				●	
Recognize DHS evolutionary process and promote DHS National Infrastructure Protection Plan; nationally recognized organization that could speak for multiple lifelines with credibility (funder, educator, collector "user fee" vs. tax)				●	●
Lobby Congress				●	

Table C-10 Next Steps Identified by Mixed-Sector Groups

Next Steps	Group 1	Group 2	Group 3	Group 4	Group 5
Identify individual (operators; public) benefits – "what's in it for me"; identify and build coalitions (pro/con); identify success stories (demo project grants; multihazard integration; performance measure met)	●	●	●		
Break issues into manageable pieces; establish performance and recovery standards with post-disaster data collection (e.g., Department of Energy impact data); design/develop software to assess costs for various scenarios for all lifelines	●	●			●
Identify synergies; bring regional and national stakeholders together through lifeline interdependencies to enable recovery; identify groups/facilities that need to work together	●	●	●		
Assess existing initiatives – National Infrastructure Protection Plan, etc.; Project Impact for utilities and multi-impact organizations; use national plan with ALA or other key body (sector coordinators and/or Information Sharing and Analysis Centers) to determine implementation; assign responsibilities to federal, state, and local government and others	●		●	●	●
Reduce liability by treating hazardous material with greater care		●			

Appendix D

MEETING EVALUATION

The roundtable closed with an open discussion of the effectiveness of the roundtable format and of modifications that could have benefited the roundtable discussions. Whether at the roundtable or subsequently, most participants have responded that the meeting was helpful for information sharing and networking. Each lifeline sector in the facilitated plenary discussions could see itself compared with the other sectors and gauge its relative progress against other sectors. It provided an opportunity to realize that other lifeline sectors face similar problems in managing the risk from natural hazards and manmade threats and that some sectors have found solutions that may be relevant to other sectors.

The roundtable format utilizing breakout groups according to lifeline sector appeared to work well. The mixed lifeline sector breakout groups also provided valuable information; however, it was noted that the questions addressed in these mixed groups could have been more clearly stated. One participant suggested that it may have helped to have the lifeline sector groups develop questions for the mixed lifeline sector groups. Further, many of the roundtable participants would have liked to have basic information before the meeting about the lifeline sectors and their regulators. Of particular interest was information about ongoing interaction with DHS. ALA had considered asking the roundtable invitees to fill out a pre-meeting questionnaire, but ALA decided to forgo this because of uncertainty in obtaining required approval in time from the Office of Management and Budget and concerns regarding the time available for invitees and their staffs to complete a survey. Finally, many of the roundtable participants expressed interest in having more input from DHS during the roundtable, especially to clarify the DHS perspective on managing risk both for natural hazards and manmade threats including weapons of mass destruction (WMD) and terrorism.

HISTORY OF THE AMERICAN LIFELINES ALLIANCE

In 1998, the Federal Emergency Management Agency (FEMA) formed and underwrote the American Lifelines Alliance (ALA) as a public-private partnership project with the goal of reducing risks to lifelines from natural hazard events. Participating in the partnership are FEMA, the National Institute of Building Sciences Pacific Gas and Electric Company, Radian/ROHN, the U.S. Geological Survey, and the U.S. Bureau of Reclamation. The formation of the ALA was in direct response to the 1990 *Reauthorization of the National Earthquake Hazards Reduction Program* (PL 101-614) and *Recommendations of the Lifeline Policymakers Workshop* (see NIST PB98-110273, October 1997). The ALA is currently managed through the Multihazard Mitigation Council of the National Institute of Building Sciences, a nonprofit, nongovernmental organization formed in 1976 under authorization by Congress (PL 93-383) to serve as an independent authoritative source of advice on issues of Building Science and technology (its Multihazard Mitigation Council was established in 1997 to reduce the total losses from natural and other hazards by fostering and promoting consistent and improved Multihazard risk mitigation strategies, guidelines, and practices)..

While the formation of the ALA originated as a response to earthquake hazards, it became immediately apparent that rational risk-management decisions would require that actions to reduce earthquake risks consider other natural hazard risks as well as normal operational and maintenance requirements to assure reliable service. The ALA has identified and worked to provide tools available to assist lifeline operators and stakeholders in utilizing the best available practices to make better-informed decisions with respect to achieving the desired level of system performance.

For further information on ALA activities and products see the inside front cover of this report, write the ALA at the Multihazard Mitigation Council of the National Institute of Building Sciences, 1090 Vermont Avenue NW, Suite 700, Washington, DC 20005, e-mail cheider@nibs.org, or visit the ALA website at www.AmericanLifelinesAlliance.org.