Gas/Electricity Interdependencies and Recommendations

North American Electric Reliability Council

Prepared by the
Gas/Electricity Interdependency Task Force
of the
NERC Planning Committee

NERC Board of Trustees
June 15, 2004

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I. Introduction

In October 2002, the North American Electric Reliability Council (NERC) Board of Trustees agreed with the Reliability Assessment Subcommittee that interdependencies between gas pipeline operations and planning and electric generation operations and planning could be a reliability issue. Therefore, the NERC Planning Committee, to address the reliability concerns associated with the industry's dependence on natural gas for electricity generation, formed the Gas/Electricity Interdependency Task Force (GEITF), chaired by Ken Wiley, president and CEO of the Florida Reliability Coordinating Council. The task force scope document was approved by the PC on January 28, 2003 and by the board at its February 2003 meeting.

The GEITF's primary goal was to determine the interdependency relationship between gas pipeline system operations and planning and electric generation operations and planning. The task force was also to recommend possible measures to mitigate any negative reliability impacts for any such interdependency between the two industries.

II. Executive Summary

The GEITF was tasked with examining the interdependency relationships between gas pipeline operations and planning and electric generation operations and planning. Recommendations to mitigate any negative reliability impacts that result from any interdependencies were to be provided to the Planning Committee and the NERC Board of Trustees at the conclusion of the GEITF's activities.

The GEITF developed a work plan that included gaining a thorough understanding of gas pipeline planning, operational, regulatory, and tariff processes. The GEITF then compared these gas pipeline processes to the electric system equivalents. The GEITF also gathered information about pipeline disruptions that had, or could have had, an adverse impact on the reliability of the electric grid. It received reports on existing studies that have examined the interaction of gas pipelines and electric generation. Finally, the GEITF prepared recommendations for NERC to mitigate adverse reliability impacts that result from the interdependencies between the gas pipeline industry and the electric industry.

The GEITF held a series of meetings that involved presentations from both the electric and gas pipeline industries. It also toured the facilities of a major gas pipeline control center and an electric transmission control center. As a result of the information gathered at these meetings, the GEITF concluded:

- Gas pipeline reliability can substantially impact electric generation.
- Electric system reliability can have an impact on gas pipeline operations.
- In general, pipeline and electric system operators do not understand each other's business very well.
- Pipeline planning and expansion are substantially different from the electric equivalent.
- Communications between pipeline operators and electric reliability coordinators are generally weak.
- Pipeline tariffs for firm delivery service are not compatible with peaking generation economics in many electric markets.
- Modern combustion turbines have stringent fuel delivery and fuel quality requirements.

The GEITF prepared a list of seven recommendations for NERC's consideration to mitigate reliability impacts from the interdependency between the gas pipeline industry and the electric industry. It should be noted that some of these recommendations, especially recommendations four and five, may need to be implemented through the development and submittal of a standard authorization request (SAR) under the procedure described in the NERC Reliability Standards Process Manual.

Recommendation 1 — NERC Regions should include in their regional assessment program a review of the impact of any fuel transportation infrastructure[1] interruption that could adversely impact electric system reliability.

Recommendation 2 — NERC reliability coordinators or their delegates, subject to appropriate treatment of commercially sensitive information, should develop regular, real-time communications with pipeline operators about disturbances that could adversely impact the reliability of either the electric systems or the gas pipeline.

Recommendation 3 — For planning purposes, gas pipeline outages that could have an adverse impact on the reliability of the electric systems must be coordinated with the electric industry so that plans to mitigate any impacts to the electric systems may be developed.

Recommendation 4 — NERC should develop a reliability standard relating fuel infrastructure reliability to resource adequacy.

Recommendation 5 — NERC should include analysis of fuel infrastructure contingencies that could adversely impact the reliability of the electric systems in the NERC planning standards.

Recommendation 6 — NERC should establish a monitoring system that tracks fuel infrastructure contingencies that have, or could have, an adverse impact on electric system reliability.

Recommendation 7 — NERC should, in concert with other energy industry organizations, formalize communications between the electric industry and the gas transportation industry for the purposes of education, planning, and emergency response.

[1] The focus of the GEITF was on gas transportation. However, interruptions to fuel delivery systems other than for gas could also have an adverse impact on electric system reliability.

III. Task Force Work Plan

The GEITF developed a work plan to guide its activity toward meeting the goals of the task force. The major points of that work plan are:

1. Develop a thorough understanding of the following:

    - Gas pipeline operating practices
    - Gas pipeline planning process, including criteria and standards
    - Gas pipeline tariffs
    - Regulatory approval process for the Federal Energy Regulatory Commission (FERC) pertaining to gas pipelines
    - Relationship or comparison to practices in the electric industry
    - Electric and gas interconnectivity
    - Relationship between gas pipeline operation and planning and electric generation operation and planning.

2. Gather information on specific problems that have occurred on the gas pipeline systems, including any consequences to the electrical systems.

3. Gather information and reports from existing studies that have examined the interaction of gas pipeline operation and planning, and electric generation operation and planning.

4. Prepare a summary report.

5. Based on the information gathered by the task force, prepare recommendations on what future work (if any) should be done by NERC to ensure that gas transportation issues do not adversely affect the reliability of the North American electric systems.

IV. Task Force Activities

The GEITF held two formal meetings, and members of the task force also participated in other industry forums related to the task force's goals. The minutes for these meetings along with the presentations made to the task force are available on the NERC website at http://www.nerc.com/~filez/geitf.html.

The task force met on May 15, 2003 and had presentations on gas pipeline operations and various industry studies:

- NERC Reliability Assessment Subcommittee discussion on the need to obtain guidelines for planning and operation for gas pipelines.
- Gas pipeline planning and how various FERC orders have impacted the gas business.
- Gas pipeline operations.
- Current electric/gas industry studies.
- A tour of the Tennessee Gas Pipeline/ANR Pipeline Gas Control Center.
- Began assembling a list of incidents in gas and electricity operations that could have impacts on each other's systems.

The task force met on September 10 and 11, 2003 and received several presentations related to the work of the GEITF:

- FERC Regulation of Pipeline Rates described the various pipeline rate structures and the process for construction of new transportation capacity
- Combustion Turbine Delivery Requirements described fuel quality and delivery requirements for the modern generation of combustion turbines,
- The impact of the August 14 blackout on pipeline operations and how the blackout affected their ability to supply gas to generating units
- A discussion of how the California ISO (CAISO) interacts with the California pipelines
- A comprehensive tour of the CAISO facility

One member of the GEITF is also a member of the U.S. Department of Energy (DOE) Steering Council evaluating gas disruptions on a regional basis. This group manages DOE-funded analyses of the regional response to and consequences from any disruption of gas pipeline capacity from natural or criminal causes. These studies were initiated by the Interstate Natural Gas Association (INGAA) and the American Gas Association (AGA), and are now conducted with federal funding under contracts with the Gas Technology Institute.

A GEITF member participated in the review of the Multi-Regional Assessment of the Adequacy of the Northeast Natural Gas Infrastructure to Serve the Electric Power Generating Sector study that was sponsored by several ISO/RTOs and NERC.

Several members of the GEITF actively participate in the North American Energy Standards Board (NAESB) Gas Electric Coordination Task Force.

V. Discussion

The presentations received by the GEITF at its meetings provided the information requirements of the work plan. This information is summarized in the following sections.

A. Comparison of Pipeline and Electrical System Planning

Many similarities exist between gas pipeline planning and operations and electrical transmission system planning and operations, but significant differences exist as well. These differences occur because the transmission system owner has very little control over the size or location of the electrical loads served by the transmission system, or in the timing of the use of electricity by the ultimate customer. A pipeline, on the other hand, knows the exact location of the customers who have a firm right to transportation capacity, and has contracts in place that describe exactly how much firm transportation capacity each customer may call upon.

In general, the owners of the electrical systems *anticipate* load growth, and plan, design, and construct a transmission system that meets specific reliability standards and that is capable of serving the forecasted customer demands. The nature of the electrical grid, with numerous nodes where facilities are interconnected, and multiple parallel paths for electricity to flow, results in a flexible, robust electrical delivery system. Often, substantial capability exists to accommodate growth in demand or to provide service to customer demands from alternative generation sources.

In general, pipelines *react* to load growth. FERC will generally not authorize new pipeline capacity unless customers have already committed to it, and pipelines are prohibited from charging the cost of new capacity to their existing customer base. Thus, additional customers request firm service from a pipeline that then adds new facilities or improves existing facilities, resulting in new pipeline capacity closely matching the requirements of the new customers. If all of the pipeline's firm customers use their full capability, little or no excess pipeline capacity will be available.

Electrical systems are regulated by a combination of federal, state, and local authorities. FERC approves the rates for transmission service for wholesale electrical transactions. State or federal authorities usually approve electrical system expansion for major facilities. Retail electric rates are approved by state commissions for regulated utilities, local governments for municipal utilities, or consumer-owner boards for cooperative utilities.

Interstate gas pipelines are regulated by FERC, and approval for new major pipeline facilities is obtained from FERC. A significant amount of electric generation is served by local distribution companies and intrastate pipelines that are regulated at the state level.

Pipeline tariffs for firm service, like electric transmission tariffs, are cost based. Gas interruptible service is provided on an as-available basis at volumetric rates.

B. Gas Delivery Requirements for Modern Combustion Turbines

Modern combustion turbines have more stringent gas delivery requirements than older units. Higher required pressures and complex on-site gas cleanup and processing systems result in the potential for additional points of failure for the combustion turbine. Delivery pressures of 450 psig at the fuel skid are required for the most popular of the newer turbines. Consistent fuel quality is necessary for the generator to meet operational and environmental requirements. These newer, larger, combustion turbine/combined cycle units are less tolerant to variations in gas quality and pressure than older units. Some combustion turbines require the gas to be heated prior to burning (hot gas units), thereby significantly increasing the start-up time from 10 minutes to 45 minutes.

C. Pipeline Electricity Interdependency

Pipeline deliverability can impact electrical system reliability in several ways. A physical disruption to a pipeline, or to a compressor station, can interrupt the flow of gas or reduce pressure to multiple electric generating units. At times of peak loading on the gas pipeline system, interruptible customers may be curtailed so that the pipeline may fulfill its contractual obligations to firm customers. As noted, firm customers can contract up to 100 percent of the capacity in a pipeline, since pipelines do not build capacity to serve interruptible customers. Historically, pipelines have built capacity to meet a winter peak demand resulting in under-utilized capacity in the summer months. Some electrical generators have made business decisions to purchase interruptible gas delivery service. Pipeline delivery service tariffs for firm service typically contain a fixed monthly charge for reserving capacity that is not recovered from the electric marketplace for the low capacity factor operation typically seen by combustion turbine generation in peaking service. Thus, it is economically infeasible for a peaking generator to make capacity reservation payments for firm service that it cannot recover from its sales of electricity. If such a generator served by interruptible transportation has no alternative source of fuel, then that generating capacity could be unavailable to the electric grid at peak times.

Electrical systems also have the ability to adversely impact pipeline reliability. The sudden loss of a large, non-gas-fired generator can cause numerous smaller, gas-fired combustion turbines to be started in a short period of time. This sudden demand may cause pipeline pressure drops that could reduce the quality of service to other pipeline customers, including generators. Electric transmission system disturbances may also interrupt service to electric motor-driven gas compressor stations.

D. Pipeline Events Impacting Reliability

The GEITF surveyed its members to collect anecdotal information about gas or electric supply incidents that either impacted, or had the potential to impact, the electric system or the gas delivery system. Over one dozen events were reported during the period of 1995 through early 2002. These events ranged from weather-related shutdowns of gas supply fields (hurricanes in the Gulf of Mexico) to pipeline ruptures. Each of these incidents either interrupted the supply of gas to electric generators or had the potential to interrupt supplies. In many of the reported

instances, pipeline capacity was only partially impaired, but generators served by the pipeline's interruptible service were the "first off," and were thus disproportionately affected by the disruptions.

E. Gas Pipeline Integrity Management Rule

The Pipeline Safety Improvement Act of 2002 (49 U.S.C. 60101) requires pipeline operators to conduct a risk analysis to adopt and implement an integrity management program. In compliance with the statute, on December 15, 2003, the Department of Transportation's Research and Special Programs Administration's (RSPA) Office of Pipeline Safety (OPS) issued a final rule on Gas Transmission Pipeline Integrity Management (68 FR 69778)[2]. Similar to the final rule for integrity management of hazardous liquid pipelines, RSPA/OPS has four fundamental objectives for the Gas Transmission Pipeline Integrity Management final rule:

a. To increase the level of integrity assessments (i.e., in-line inspection, pressure testing or direct assessment) for pipelines that can affect high consequence areas,
b. To improve operator integrity management systems,
c. To improve government oversight of operator integrity management programs, and
d. To improve public assurance in pipeline safety.

The Gas Transmission Pipeline Integrity Management rule provides the foundation for RSPA/OPS to move beyond an assessment of the current metallurgical condition of the pipe and to assess the overall management and systems used by an operator to implement effective and timely actions to maintain pipeline safety.

Gas pipeline operator's compliance with the new regulations will likely reduce the operating flexibility of pipelines from time to time, and reduce the available pipeline capacity while pipelines perform certain compliance activities. Over the long term, these efforts should improve the integrity and reliability of the pipeline grid.

During the baseline period 2003–2012, the gas industry will place the heaviest demand on its service industry as they gear up to meet the new requirements. Most extensive pipeline capacity reductions will be due to facility modification for repair/remediation. Historical inspection data has indicated significantly more corrosion anomalies requiring action as a result of first run inspections rather than as a result of subsequent re-inspections.

F. Communications Between Reliability Coordinators and Pipeline Operators

A reoccurring theme expressed by the gas industry participants in the GEITF was concern about communications between pipeline operators and entities other than the pipeline's contractual customers. Thus, the pipeline will communicate with the local gas distribution company (LDC)

[2] Specific requirements of the final rule and extensive information on its implementation and enforcement can be found at: http://primis.rspa.dot.gov/gasimp.

serving a generator, or will communicate with the generator itself, but will not freely communicate with a regional reliability coordinator. This is due to the confidentiality of commercially sensitive business information and regulatory restrictions. The electric industry's concept of a reliability coordinator does not have a parallel entity in the pipeline industry. The GEITF received a report from CAISO that it believes represents a good model for inter-industry communications. CAISO and the two major gas pipeline operators within its footprint have regular communications on the status of the electric systems and the pipeline systems. Seasonal meetings are held to prepare for the upcoming summer or winter peak seasons.

VI. Conclusions

Based on the information gathered at its meetings, the GEITF was able to draw the following conclusions:

- Gas pipeline reliability can substantially impact electric generation.
- Electric system reliability can have an impact on gas pipeline operations.
- In general, pipeline and electric system operators do not understand each other's business very well.
- Pipeline planning and expansion are substantially different from the electric equivalent.
- Communications between pipeline operators and electric reliability coordinators are generally weak.
- Pipeline tariffs for firm delivery service are not compatible with peaking generation economics in many electric markets.
- Modern combustion turbines have stringent fuel delivery and fuel quality requirements.

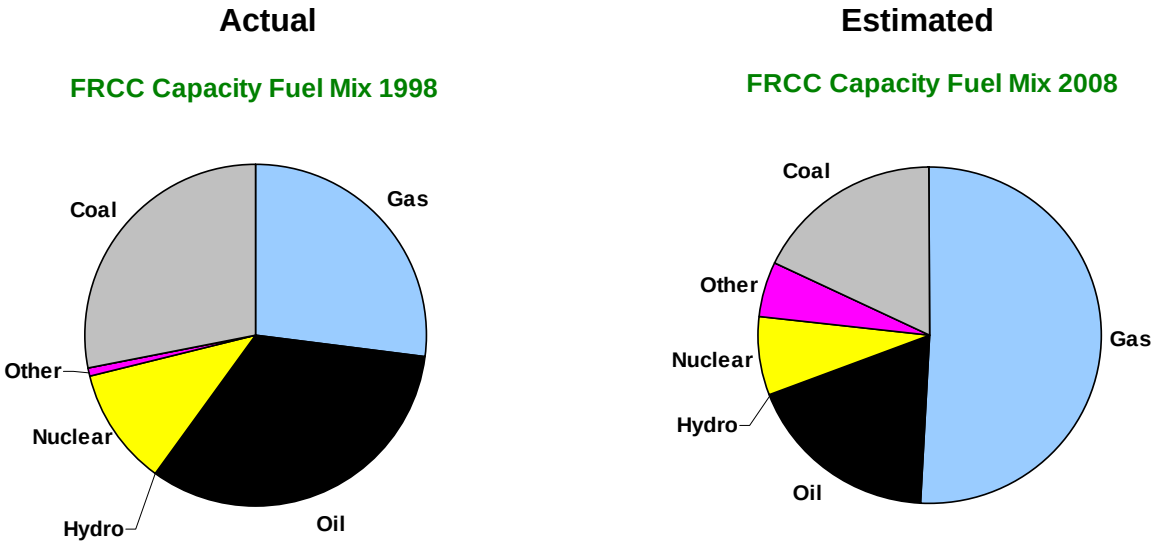
VII. Recommendations

The GEITF determined that interdependency between the gas pipeline and electric industries could lead to negative reliability impacts, and developed seven recommendations for future NERC action. The NERC PC approved these recommendations at its March 2004 meeting in Nashville, Tennessee. It should be noted that some of these recommendations, especially numbers four and five, may need to be implemented through the development and submittal of a standard authorization request (SAR) under the procedure described in the NERC Reliability Standards Process Manual.

1. **NERC Regions should include in their regional assessment programs a review of the impact of any fuel transportation infrastructure interruption that could adversely impact electric system reliability.**

   Analysis and assessments are needed on a regional basis. For example, as reported in the 2003 NERC RAS report[3], FRCC members are projecting the net addition (i.e., additions less removals) of 16,013 MW of new capacity through 2013. Of this, 13,160 MW are projected to be natural gas-fired combined cycle units (see Figure 1). FRCC formed its Natural Gas/Electricity Interdependency Task Force in 2003 to assess and monitor the risks associated with having an ever-increasing percentage of generating units fueled by natural gas. This FRCC task force is focusing on pipeline transportation adequacy and reliability as it affects electric generator operation and reliability in FRCC. As shown by Figure 2, Florida is a state that is almost totally dependent on the interstate natural gas pipelines served by a relatively limited gas pipeline network for supply[4].

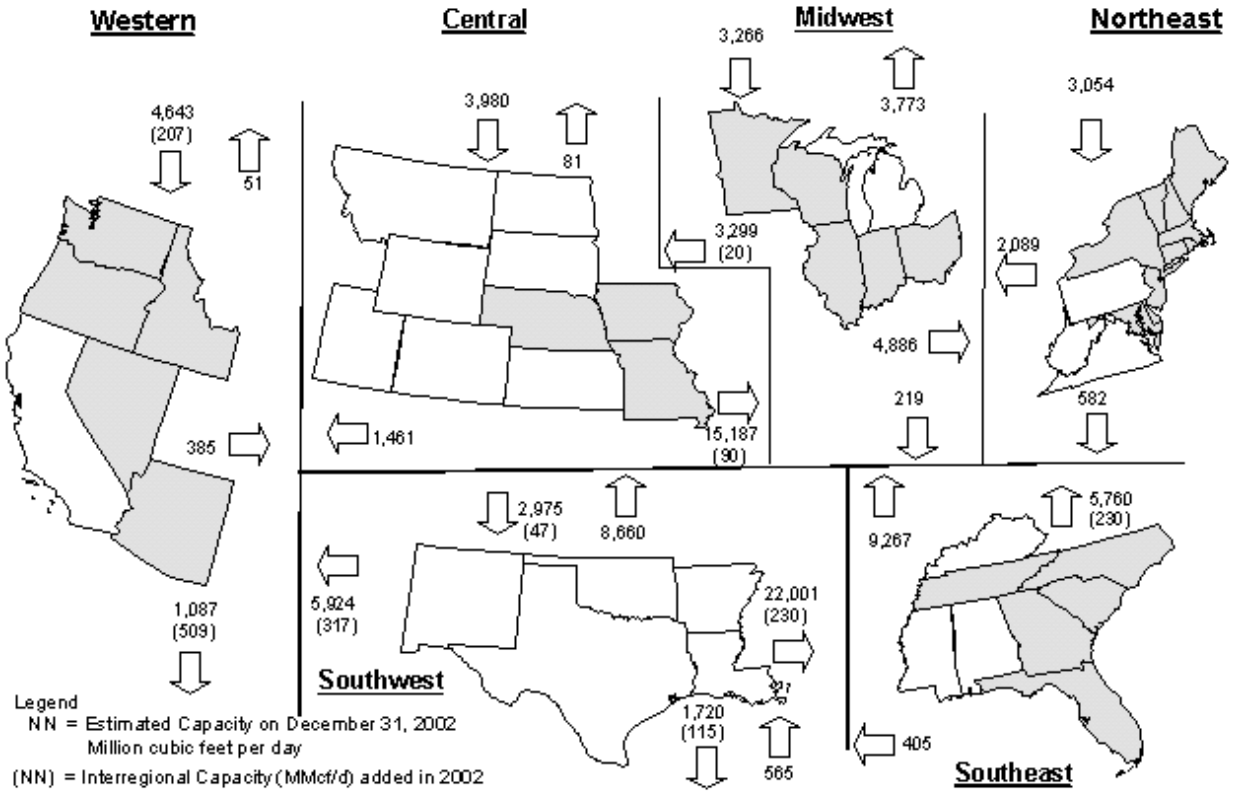
Figure 1. 2003 RAS FRCC Fuel Mix Comparison — 1998–2008 (estimated)



[3] NERC *Reliability Assessment 2003–2012*, December 2003; http://www.nerc.com/~filez/rasreports.html.
[4] http://www.eia.doe.gov/pub/oil_gas/natural_gas/feature_articles/2003/Pipenet03/pipenet03.html.

Each Regional Reliability Council has unique characteristics that require specific regional understanding to evaluate the impact of fuel transportation interruptions on electric system reliability. The results of these analyses should be included in the annual long-term NERC Reliability Assessment Subcommittee reports.

Figure 2. Region-to-Region Natural Gas Pipeline Capacity, 2002



Source: Energy Information Administration, GasTran Gas Transportation Information System, Natural Gas Pipeline Capacity Database.

2. **NERC reliability coordinators or their delegates, subject to appropriate treatment of commercially sensitive information, should develop regular, real-time communications with pipeline operators about disturbances that could adversely impact the reliability of either the electric system or the gas pipeline.**

Implementation of this recommendation will lead to reliability personnel becoming better able to more effectively perform their duties through real-time communications. It will increase situational awareness, provide for more precise communications, and increased knowledge of the interdependence of the two industries.

Special considerations should be given to the confidential nature of the commercial information available to reliability personnel in both industries. Procedures must be

established so that this type of information is maintained only by reliability personnel, and is not shared with commercial interests in either the electrical, gas supply, or gas transportation industries. Training for operators must pay particular attention to the type of information that may be communicated.

Implementation of this recommendation should be on a regional basis as regional variation on the interdependencies exists between gas delivery and electric generation. Communication protocols specific to each Region should be developed between the reliability coordinators and the gas pipeline operators serving electric generation in each Region. This recommendation should be implemented only after an appropriate training phase. The training phase should instruct reliability personnel of the electric and gas industries on the location and ownership of gas and electric facilities that could have an adverse reliability impact on either the electrical grid or the gas transportation network.

3. **For planning purposes, gas pipeline outages that could have an adverse impact on the reliability of the electric systems must be coordinated with the electric industry so that plans to mitigate any impacts to the electric systems may be developed.**

   Pipelines serve two primary markets: the LDC with winter peaking requirements, and the electric industry that peaks in the summer and winter, depending on location. This leaves the spring and fall as the optimum times for pipeline maintenance activities. The Gas Pipeline Integrity Management Rule is mandating increased pipeline testing, and it is possible that the shoulder seasons will not provide adequate time for all of the pipeline planned outages. This activity will coincide with a time when pipelines are expecting record demands on their available pipeline capacity. It is therefore imperative that any major gas pipeline outages be coordinated with the electric industry so that plans to mitigate any adverse impacts to the electric systems may be developed in advance. This coordination includes not only coordination with the affected individual gas-fired generating unit's operators, but also with their corresponding ISO/RTOs and reliability coordinators. NERC should work with the pipeline companies, and pipeline and LDC industrial groups (INGAA and AGA) to discuss the timelines and procedures to minimize the impact of pipeline outages on all customers of the gas pipelines.

   Furthermore, this recommendation needs to be national in scope. Because of the relatively few supply areas for gas and the interrelated pipeline infrastructure that must transport gas from the supply areas to the market areas, a gas pipeline outage in Louisiana (for example) could potentially impact both electrical and gas customers at other locations in the United States.

4. **NERC should develop a reliability standard relating fuel infrastructure reliability to resource adequacy.**

   This recommendation provides that NERC and the Regional Reliability Councils take into account the certainty that generation resources, which are needed to meet a Region's resource adequacy criteria, will not be contingent on the availability of non-firm fuels.

As discussed earlier in the report, some electrical generators have made business decisions not to pursue firm gas delivery service, thus subjecting them to possible fuel supply interruptions at times of peak electrical demand. Most gas turbine peaking generation falls into this category. To partially mitigate this concern, some generators have alternate fuel supplies with one to two days' capability. Others have no alternate fuel supplies. Regions need to have a thorough understanding of each generator's fuel supply firmness to assess the vulnerability of generation not being available during peak demand periods. A reliability standard should include requirements for counting generation in resource adequacy reserve calculations taking into account back-up fuel capability, the terms of generator fuel supply and transportation contracts, and conditions governing generator obligations to provide capacity under its corresponding regional market rules.

With a majority of the new generation relying on natural gas as a fuel source, the question of near-term and long-term adequacy of both the availability of natural gas and the infrastructure to move it to the generating stations is coming under increased scrutiny.

In ERCOT, for instance, a growing concern exists about the future adequacy of natural gas supply, given the fact that over 60% of existing and projected total generating capacity in ERCOT is fueled solely by natural gas. In late February 2003, widespread gas curtailments to electric generators throughout the region during several days of cold weather affected available generating capacity[5].

As another example, New England has added almost 10,000 MW of new gas-fired generating capacity in the last three years; approximately 38% of New England's generating fleet is now gas fired, versus approximately 12% in 1998. Gas unit availability was a critical factor during the recently experienced January 2004 cold snap. ISO New England is in the process of identifying the problems and developing solutions on a collaborative basis with the New England Power Pool, state officials, and stakeholders in the gas and electric industries[6]

Based on the growing trend of increasing amounts of gas-fired generation being planned and built, the GEITF recommends that NERC develop a reliability standard relating fuel infrastructure reliability to resource adequacy.

Implementation of this recommendation would vary by Region due to factors such as: (1) the amount of regional capacity fueled by natural gas; (2) the network of pipelines serving a region; and (3) the amount of generation fueled by non-firm gas.

5. **NERC should include analysis of fuel infrastructure contingencies that could adversely impact the reliability of the electric grid in the NERC planning standards.**

[5] NERC *Reliability Assessment 2003–2012*, December 2003; http://www.nerc.com/~filez/rasreports.html.
[6] http://www.iso-ne.com/committees/Transmission_Expansion_Advisory_Committee/Fuel_Diversity_Working_Group-FDWG/

The NERC planning standards[7] state the fundamental requirements for planning reliable interconnected bulk electric systems. The planning standards presently define the reliability of the interconnected bulk electric systems in terms of their ability to supply the aggregate electrical demand and energy requirements of their customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements; and their ability to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements. In addition to the NERC planning standards, individual Regions have also developed their own regional planning criteria.

Due to the growing reliability concern of the electric industry's dependence on the natural-gas infrastructure, the GEITF recommends that analysis of fuel infrastructure reliability contingencies, which could adversely impact the reliability of the electric grid, be added to the current list of fundamental NERC planning standards requirements, and be included in any successor NERC requirements[8].

6. **NERC should establish a monitoring system that tracks fuel infrastructure contingencies that have, or could have, an adverse impact on electric system reliability.**

   This recommendation provides for both an increased awareness and an understanding of the potential impacts of fuel delivery system interruptions on the electric systems. A tracking system that would also summarize the data would provide planners and operators with information to elevate the level of their contingency analyses. It would also increase awareness of the frequency of events that could have an adverse impact on reliability. Consideration must be given to how the information is collected. NERC should work in conjunction with the gas industry, INGAA, and AGA to identify the appropriate types of fuel infrastructure contingencies to be tracked.

7. **NERC should, in concert with other energy industry organizations, formalize communications between the electric industry and the gas transportation industry for the purposes of education, planning, and emergency response.**

   This recommendation will assist in facilitating understanding between the gas and electric industries. NERC should contact industry trade groups with the goal of establishing regular, industry-wide forums to help educate each industry about the other. As the electric industry relies more on natural gas, it is impossible for it not to impact other customers of the pipelines. To the extent that each can understand the operational

[7] Available at: http://www.nerc.com/~filez/pss-psg.html.
[8] NERC is presently developing a single set of reliability standards to replace its existing operating policies and planning standards. These new reliability standards will address planning and operations, and will include compliance measures for each standard.

requirements of the other, it should be possible to reduce the amount of negative impacts between the industries.

NERC and other trade associations will need to evaluate the regulatory and legal barriers to sharing reliability information, which may require the involvement of regulatory agencies.

Appendix A

NERC
GAS/ELECTRICITY INTERDEPENDENCY TASK FORCE

REVIEW OF INTERDEPENDENCY BETWEEN
GAS TRANSPORTATION AND ELECTRIC GENERATION

SCOPE

PURPOSE

The purpose of the review is to determine the interdependency relationship between gas pipeline operation and planning, and electric generation operation and planning reliability over the next 10 years. If, in fact, negative reliability impacts are found, it is anticipated that additional industry effort will be established to perform any detailed analysis or studies to determine precise mitigation measures. The review will identify and recommend possible measures to mitigate any negative reliability impacts.

It is not the purpose of this task force to make an assessment of the adequacy of gas supplies to meet the needs of gas-fired electrical generation. This is an important topic but it is outside the scope of this task force review.

TASK FORCE COMPOSITION

FERC
DOE
EPRI
NARUC
National Energy Board of Canada
Provincial Regulatory Agencies
Canadian Electricity Association
Canadian Gas Association
Gas Pipeline Associations
Individual Pipeline Owners
Electric System Planners and Operators
Gas Supply Organizations
Gas Local Distribution Companies
Generator Organizations
Individual Generator Owners
Large Customers
Regions, or subregions which have a high dependency on natural gas
ISOs/RTOs
National Petroleum Council

TASK FORCE REPORTING RELATIONSHIP

The task force shall report to the NERC Planning Committee. Status reports shall be given to the Planning Committee, Operating Committee, Market Interface Committee, and the Board of Trustees.

TASK FORCE ACTIVITIES

PHASE I:

(1) Establish a work plan to develop a thorough understanding of the following:

(a) Gas pipeline operating practices
(b) Gas pipeline planning process, including criteria and standards
(c) Gas pipeline tariffs
(d) Regulatory approval process for FERC, NEB, individual states and provinces pertaining to gas pipelines
(e) Relationship or comparison to practices in the electric industry
(f) Electric and gas interconnectivity
(g) Relationship between gas pipeline operation and planning, and electric generation operation and planning reliability over the next 10 years.

(2) Gather information on specific problems that have occurred on the gas pipeline systems, including any consequences to the electrical systems.

(a) All events within the last 36 months
(b) Major events older than 36 months but less than 8 years old
(c) Major pipeline events that affected deliverability but did not affect electric generation (near-miss events) within the last 36 months

(3) Gather information and reports from existing studies that have examined the interaction of gas pipeline operation and planning, and electric generation operation and planning.

(4) Prepare a Summary Report on gas pipelines and their interrelationship with, and potential impact on, the reliability of electric generation operation and planning.

(5) Based on Phase I results, prepare recommendations on what future work (if any) should be done by NERC to ensure that gas transportation issues, such as those listed below, do not adversely affect the reliability of the North American electric systems.

a. Existing routes
b. Pipeline capacity
c. Current utilization
d. Projected needs
e. Planned expansions with assessment of probability of completion and key dates
f. Issues identified in Phase I

SCHEDULE

Phase I is anticipated to be completed within 9 months.

Approved by the NERC Planning Committee: January 28, 2003
Approved by the NERC Board of Trustees: February 11, 2003

Appendix B

NERC GAS/ELECTRICITY INTERDEPENDENCY TASK FORCE

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