



**ISO New England's Management Response to the October 12,
2004 publication entitled *Final Report on Electricity Supply
Conditions in New England during the January 14 - 16, 2004
"Cold Snap"***

ISO New England Inc.

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I. Executive Summary

The Final ISO New England Inc. (the ISO) Cold Snap Report provides over twenty recommendations for improving the reliability of the power system and the efficiency of the New England electricity markets during extreme cold weather events. The Management Response to the Final Report specifies action steps to address each of these recommendations. These action steps are the result of months of planning and collaboration involving ISO staff, New England Power Pool (NEPOOL) participants, state utility and environmental regulators, gas industry representatives, and the New England Governors' Conference Power Planning Committee.

The action steps identified by the ISO and asset owners for winter 2004/2005 are expected to improve supply-side resource availability in New England by at least 2,000 megawatts (MW) over the performance during the January 14-16, 2004 Cold Snap (Cold Snap). Many of these actions have already been completed by the ISO. Asset owners (transmission, generation, and distribution) in New England have taken meaningful steps to incorporate lessons learned from the Cold Snap to improve their availability and performance during similar future periods. The ISO is in the process of confirming that generators experiencing forced outages from the severe cold weather in January 2004 have taken corrective actions to mitigate these issues (e.g., added heaters to air handling systems, improved valve seals, and other actions).

Longer-term action steps are also identified to improve import capabilities with neighboring systems, to develop electric market incentives to encourage more dual-fuel generating capacity in New England, and to create incentives for the use of firm-gas transportation arrangements for gas-only generating units.

Actions Since January 2004

Immediately following the Cold Snap, the ISO initiated a comprehensive review of electric and gas infrastructure issues with the establishment of the New England Electric/Gas Wholesale Initiative. This initiative brought together government officials, gas and electric industry participants, ISO staff, and reliability council officials in an effort to define the issues and develop potential short-term and long-term solutions. The ISO and NEPOOL also formed a Cold Snap Task Force to review any needed market-rule or procedural changes to address Cold Snap issues in the short term.

The ISO initiated a dialogue with New England's environmental regulators to clarify the ability of dual-fuel units to switch to their alternate fuel during emergency conditions, based on their existing air quality permits. Additional meetings were held with gas pipeline officials to improve the understanding of the interdependence between electric and gas system operations and markets. The ISO engaged consultants to model and evaluate the performance of the electric and gas infrastructure in New England during the Cold Snap and to assess historical winter operations and the operability of dual-fuel units. This effort also addressed the potential for expansion of dual-fuel capability.

Various issues were identified and reviewed in open forums of the Electric/Gas Wholesale Initiative, including the following:

- Real-time electric and gas industry coordination is critical during extreme weather events.
- Some dual-fuel generating units lack clear, unambiguous guidelines for switching to their alternate fuels during a power system emergency declared by the ISO.

- Mismatches between the gas and electric industry trading deadlines create market inefficiencies and potentially significant market risks for participants during periods of extreme price volatility.
- Gas pipeline companies will not expand infrastructure for gas-fired power plants without long-term firm contracts.
- Electricity-market incentives may not be sufficient for gas-fired units in New England to engage in long-term gas transportation contracts or to pursue dual-fuel capability.
- During extremely cold periods, the relative volatility of intra-day gas spot prices—with respect to electricity-market real-time prices—may make it uneconomical for gas units to convert natural gas into electricity.
- NEPOOL Operating Procedure Number 5 (OP5) granting and terminating “economic outages” is unclear.
- There is limited liquefied natural gas (LNG) import terminal capability in New England.

Winter 2004/2005 Action Steps

Based on the efforts of the Electric/Gas Wholesale Initiative and the ISO/NEPOOL Cold Snap Task Force, the following short-term actions are completed or scheduled for completion prior to the winter 2004/2005 operating period:

- Establishment of an operations committee, led by the ISO and the Northeast Gas Association, including the interstate gas pipelines and local gas distribution companies (LDCs) to improve near-term operations planning and coordination of maintenance of both the electric and gas pipeline systems. Communication protocols will be consistent with the NEPOOL Information Policy, Federal Energy Regulatory Commission (FERC) Standards of Conduct, and antitrust law.
- Implementation of remedial actions by asset owners to improve the availability and performance of their transmission, generation, and distribution assets during extreme winter weather conditions.
- Development of a new operating procedure for extreme cold weather periods that would trigger:
 1. Elimination and cancellation of “economic outages” for the duration of the cold weather period;
 2. Efficient switching to alternative fuels for dual-fuel units; and
 3. Modification of ISO unit commitment processes/procedures and electricity-market trading deadlines to enhance coordination between the electric and gas market nomination timelines, allowing greater utilization of existing gas infrastructure.

The ISO anticipates that the combination of the above actions will improve overall supply-side resource availability by at least 2,000 MW for winter 2004/2005.

Long-Term Action Steps

The ISO has identified several other key actions that will also provide significant benefit to New England relative to the Cold Snap issues identified but will not be available for implementation prior to winter 2004/2005. These include:

- Establishing “Best Practices” procedures in transmission line ratings and transfer capability calculations to maximize import/export capabilities between New England and neighboring regions during extreme weather/abnormal events;
- Developing economic incentives for the installation of expanded dual-fuel capability or firm transportation contracts for gas-only units and improved availability of equipment during extreme winter weather events. These incentives are contained in the recent Locational Installed Capacity market (LICAP) proposal and the proposed enhancements to the Forward Reserve Markets; and
- Investigating market-design improvements to allow increased flexibility for generator offers within the wholesale energy market.

The above short-term and long-term action steps are projected to improve generator availability during extreme cold weather conditions. A host of important additional actions have been completed or are scheduled to be completed, as the body of this Management Response indicates. These are all focused on protecting power system reliability and improving the efficiency of New England’s electricity markets. All action steps have been developed through a collaborative process involving ISO staff, NEPOOL participants, gas industry representatives, and New England government officials.

II. Introduction

During January 2004, New England, as well as the greater northeast region of the United States and eastern Canada, experienced some of the most extreme winter weather in recent history. January 2004 was the coldest January on record in the Boston area since 1888. During a cold snap that took place between January 14 and 16, 2004, both the electric and natural gas systems experienced record demand that tested the reliability of the regional energy delivery systems. Although operating conditions were difficult, both the regional bulk electric power system and natural gas system reliably served the regional peak demands during the Cold Snap. The ISO implemented emergency operating procedures to deal with a capacity deficiency (OP4) of only about 100 MW on January 14, 2004. However, the event highlighted the growing interdependence of the two different energy systems within New England.

On May 10, 2004, the ISO published the report entitled *Interim Report on Electricity Supply Conditions in New England during the January 14-16, 2004 “Cold Snap”* (Interim Report). The Interim Report documents the ISO Market Monitoring Department’s (MMD) detailed investigation into both the market and operational performance of the bulk electric power grid during those extreme weather conditions. The MMD released its final version of the Interim Report (Final Cold Snap Report) in mid-October 2004.

This report is the response of ISO management (Management Response Report) to the Final Cold Snap Report. It documents the activities that have been performed to date as well as future activities to address and resolve the issues and concerns that were identified and subsequently documented within the Final Cold Snap Report under the heading: *Conclusions and Recommendations for Action* (Section V). This Management Response Report is available on the ISO website (www.iso-ne.com) along with the Interim and Final Cold Snap Reports, as well as associated supplementary materials.

III. Final Cold Snap Report Recommendations and ISO Management Responses

This Management Response Report contains the ISO’s management response to the 23 sets of recommendations identified in the Final Cold Snap Report. ISO management concurs with all of the recommendations provided by the MMD.

In response to the MMD, management’s observations, as well as the concerns raised by NEPOOL participants, electric and gas industry stakeholders, and regulatory agencies, the ISO has taken numerous actions to identify, assess, and propose changes to existing market rules, operational procedures, and communications to resolve identified problems. The Final Cold Snap Report’s 23 separate recommendations are subdivided into four categories: 1) System Operations and Reliability, 2) Market Timelines and Flexibility, 3) ISO Operations and Implementation, and 4) Market Monitoring and Analysis. Each recommendation includes actions to be investigated and subsequently implemented. This Management Response Report follows that same order. Some recommendations are grouped together because of their similarity.

A. System Operations and Reliability

Industry Coordination

Recommendation #1

The ISO should increase coordination with gas industry representatives and continue to support the activities of the Fuel Diversity Working Group (FDWG). The ISO should increase its understanding of the gas transportation system and improve its working relation with key members of the gas industry. This should include development of an explicit coordination process between the ISO and the gas industry that facilitates information exchange and resolution of operational issues. Gas utilities are for-profit market participants, and some own generation assets. Hence, any coordination process must ensure appropriate treatment of confidential market information.

Management Response to Recommendation #1

Action Steps	Who	When
1. Task the Fuel Diversity Working Group with the Electric/Gas Wholesale Initiative.	ISO & NEPOOL	Complete March 2004
2. Form the ISO/NEPOOL Cold Snap Task Force to develop short-term recommendations to enhance electric markets and ensure system reliability for winter 2004/2005.	ISO & NEPOOL	Complete March 2004
3. Form the Electric/Gas Operations Committee to facilitate the exchange of near-term operating data between the two industries, in accordance with the NEPOOL Information Policy, FERC Standards of Conduct, and antitrust law compliance.	ISO & Northeast Gas Association	Complete June 2004

In July 2003, the ISO published a White Paper on regional fuel diversity issues entitled *Natural Gas and Fuel Diversity Concerns in New England and the Boston Metropolitan Electric Load Pocket*. To address issues identified in the White Paper, the ISO established the FDWG and charged it to report to the Transmission Expansion Advisory Committee. In the first quarter of 2004, the FDWG was charged with the Electric/Gas Wholesale Initiative (EGWI), which targeted issue resolution with respect to operational, market, and communications problems experienced during the Cold Snap. To date, the FDWG-EGWI has held several workshops, which have allowed regional stakeholders to identify Cold Snap-related issues and propose solutions. The FDWG-EGWI has actively pursued development and implementation of several solutions prior to the winter of 2004/2005.

The ISO and representatives of the regional natural gas industry, through coordination with the Northeast Gas Association, have created the Electric/Gas Operations Committee (EGOC). The objective is to promote greater regional reliability of the two industries through improved education, understanding, communications, and coordination. The EGOC has met several times. During the winter of 2004/2005, each gas-sector member of the EGOC will participate in weekly operational look-ahead meetings with the ISO to forecast the occurrence of future cold weather events. The EGOC will also be responsible for the cross-training of electric and gas system operators, establishing emergency communications protocols and procedures, assessing and addressing system restoration issues, coordinating maintenance requirements, and addressing other common issues that may impact electric or gas system reliability. EGOC members will maintain compliance with the NEPOOL Information Policy, FERC Standards of Conduct, and antitrust law.

Gas Study Updates

Recommendation #2

The ISO should initiate an update of the New England Gas Studies to reflect lessons learned from the Cold Snap. Updating the studies will help the ISO better plan for future problems and may inform and motivate stakeholders to seek resolutions to problems identified in the updated report. It may be appropriate to include the updated study as an annual component of the Regional Transmission Expansion Plan (RTEP). The updated study should include:

- *A determination as to whether or not the existing pipeline capacity could have been better utilized. Although the ISO cannot directly affect pipeline utilization, data on utilization can help determine the degree to which market-timing issues impaired the efficient allocation of supply-side resources.*
- *An identification of feasible gas infrastructure capacity improvements in electricity-critical areas. Identification of gas system upgrades that would directly improve electricity system reliability can help guide investment and improve the probability of regulatory approval of specific projects.*

Management Response to Recommendation #2

Action Steps	Who	When
1. Request Levitan & Associates, Inc. to assess whether the regional pipeline capacity could have been better utilized during the Cold Snap.	ISO & Levitan	Complete March 2004

2. Address within the draft RTEP04 Report the need for additional LNG terminals in the Northeast.	ISO	Complete September 2004
3. Identify longer-term gas pipeline capacity improvements that would improve electric system reliability.	ISO	4 th Quarter 2004

The ISO retained the services of Levitan & Associates, Inc. (LAI), Boston, Ma., to develop a technical addendum to the ISO’s Interim Report. The report is entitled *Post Operational Assessment of New England’s Interstate Pipeline Delivery Capability During the January 2004 Cold Snap* and is dated March 24, 2004. That report provides results of modeling the actual operation of the regional interstate pipeline systems during the Cold Snap, with the primary objective of determining whether additional gas-fired generation could have been operating under these severe winter conditions.

Key LAI study observations are as follows:

- Gas pipelines were constrained at several important border points into New England due to production constraints in Sable Island and possibly Western Canada, and due to capacity constraints on TransCanada and Tennessee natural gas pipeline in New York.
- Assuming additional gas supplies could have been scheduled and assuming that all additional gas supplies were then earmarked for incremental electricity production rather than core send-out¹, LAI estimates that there was additional deliverability within the region’s consolidated network to provide the ISO with incremental operating reserves of about 1,200 MW on January 13. The amount of available operating reserve is estimated to increase from a range of 2,000 MW to 2,700 MW by January 17, 2004. Of critical importance, had additional natural gas supply not been available at New England’s border, pipeline transportation service to power plants in Connecticut and Massachusetts would have likely degraded service to primary firm entitlement holders. LAI notes that the derivation of incremental generation is based solely on steady-state analysis² rather than transient analysis³. Quantification of potential incremental operating reserves through steady-state analysis introduces measurement bias by not accounting for pipeline operational dynamics – the packing and drafting of the line each day – as well as the LDC’s superior contract rights. *These results do, however, represent an upper limit on the amount of additional operating reserves available to the ISO.*
- High imbalance charges on both Tennessee and Algonquin natural gas pipelines would invariably have exposed all shippers on these pipelines to punitive penalties under FERC approved transportation tariffs. The cycling characteristic of most gas-fired generators heightens the risk of penalty exposure when a pipeline’s Operational Flow Order (OFO)⁴

¹ Core send-out is gas supplied to the LDC customers at large (primarily residential and commercial customers).

² Steady state pipeline simulation is a method of flow analysis of a pipeline system that assumes constant flowing conditions. For steady state to occur, the flow into a pipe must equal the flow through the pipe, which must equal the flow out of the pipe. This condition has no change in flow or pressure with respect to time. (www.greggengineering.com)

³ Transient pipeline simulation is a method of flow analysis of a pipeline system that takes into consideration changing flow or pressure conditions over time. This unsteady or changing flow or pressure condition can be considered “on” or “off” line simulation that considers dynamic fluid flow characteristics over a specified time span. (www.greggengineering.com)

⁴ OFO in the gas industry is similar to an emergency operating procedure, or OP4, in the electric industry in New England. OFOs are formal notifications by the pipeline of LDC that require limitations on gas deliveries to ensure that the pipeline (continued...)

is in effect. Because the majority of gas-fired generation was off-line during the Cold Snap, the posting of OFOs on the Algonquin and Tennessee pipelines had a relatively minor incremental degradative impact on the scheduling of gas-fired generation throughout New England.

Operating Reserves

Recommendation #3

The ISO should review generators that provided operating reserve during the Cold Snap and evaluate, through follow-up with the plant operators, whether the operating reserves identified by the ISO dispatch software were actually available for dispatch in the event of a contingency. If they were not actually available, the ISO must seek ways to improve units' availability and to identify units actually unavailable in real time so that they are not counted as reserve providers. Coupled with this should be an evaluation of the reliability of quick-start units called on during the Cold Snap. Given the increased forced outages due to cold weather, the ISO should evaluate whether quick-start resources faced similar degradations in availability and whether this warrants revised operating procedures.

Management Response to Recommendation #3

Action Steps	Who	When
1. Review performance of the forward reserve market resources during the Cold Snap.	ISO	Complete January 2004
2. Based on experiences from the Cold Snap, modify input assumptions along with planning and operating procedures prior to winter of 2004/2005.	ISO	Complete August 2004
3. Implement short-term electric market fixes as recommended by the Cold Snap Task Force for winter 2004/2005.	ISO	4 th Quarter 2004
4. Review designated reserve providers to determine level of reserve actually available during the Cold Snap.	ISO	4 th Quarter 2004

The availability performance of the forward reserve market (FRM) resources is listed in Table 1 for the three-day period during the Cold Snap. Availability is measured for the 16 hours of on-peak delivery as required by the FRM. Availability problems were primarily the result of mechanical failures when units were called to start.⁵ For example, one plant failed to start due to diesel fuel that congealed its fuel lines.⁶

(...continued)

system maintains reliable operation.

⁵ This conclusion is based on discussions with owners and the small amount of gas-only resources.

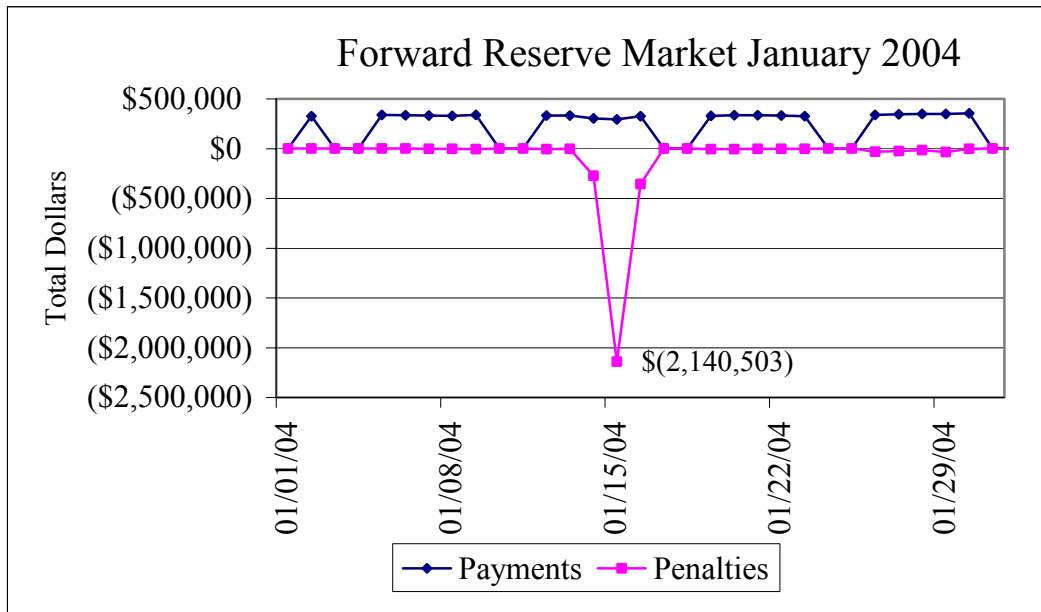
⁶ The plant has since installed a heater at substantially less cost than the availability penalty paid.

TABLE 1

Product \ Date	January 14, 2004	January 15, 2004	January 16, 2004
10-Minute Forward Reserve	74%	71%	79%
30-Minute Forward Reserve	91%	84%	96%

Forward reserve resources that were unavailable not only lost energy revenues, but also were penalized by amount of day-ahead (DA) Locational Marginal Prices (LMP) minus the strike price⁷. The highest hourly penalty was \$423/MWh. The average penalty for the period was \$125/MWh.⁸ The one-day penalty cost for unit unavailability for a hypothetical 50 MW peaking unit was approximately \$100,000 based on the average hourly penalty. This cost was in addition to lost energy revenues of \$177,648 based on the average DA LMP at the internal hub. On January 15, the DA prices were higher and the same costs at the internal hub would have been about \$220,600 and \$298,100 respectively. Therefore on January 15, the average forward reserve availability penalty almost doubled the level of the lost revenues, hence the economic incentive to maintain unit availability. The overall penalties paid by all resources are illustrated in Figure 1. On January 15, approximately \$2.1 million dollars were paid in penalties.

FIGURE 1



⁷ Forward reserve resources are required to reserve their energy for contingencies by offering their energy at or above a 'strike price.'

⁸ Based on the average internal hub price.

Only one forward reserve resource, using natural gas as a fuel, identified fuel constraints as the reason for its not being available. This represented less than 5% of the total FRM capacity. This high level of performance was partially the result of the market design, which incorporates significant penalties for lack of availability or failure to start when called upon.⁹ The fuel types of the actual FRM resources utilized are listed in Table 2.

TABLE 2

FRM Resource Fuel Type	Cleared MW	Percent of Requirement
Coal	63	3.4%
Distillate or Jet Fuel Only	810.5	43.2%
Natural Gas Only	90	4.8%
Natural Gas – Dual-Fuel	272.4	14.5%
<u>Hydro</u>	<u>640</u>	<u>34.1%</u>
Total	1,875.9	100.0%

In addition to the analysis performed to assess FRM performance, the post-operational gas study conducted by LAI indicates that some additional fuel supplies may have been available to gas-only units during the Cold Snap. However, the actual deliverable operating reserve (MW) amounts are highly dependent upon time of day and physical location. The ISO’s revised operating procedures and short-term market improvements, as recommended by the Cold Snap Task Force, are designed to increase the probability of getting natural gas to these units during future cold snap periods.

Outage Notifications

Recommendation #4

The ISO should review the outage notifications provided by generators. The ISO should have follow-up discussions clarifying market rule obligations to provide notice of outages.

Management Response to Recommendation #4

Action Steps	Who	When
1. Distribute letter to NEPOOL participants to remind them of their obligations to report generator outages and reductions on a timely basis.	ISO	October 2004
2. Discuss appropriate outage notification and sanctions policies with the NEPOOL Reliability Committee.	ISO	November 2004

⁹ A second reason is that a majority of quick-start resources, the primary source of forward reserve, result from investments made during the period of vertically integrated utilities. As a group, these older, quick-start reserve units were not restricted to firing only natural gas.

In October, the ISO will distribute a winter 2004/2005 pre-seasonal transmittal to the NEPOOL Reliability Committee and participant generators reminding them of their obligations to report to the ISO short-term (real-time) outages and reductions, including fuel limitations, as stipulated under the existing market rules and operating procedures. This transmittal will be on the October 2004 meeting agenda of the NEPOOL Reliability Committee. During the numerous meetings of the Cold Snap Task Force, ISO staff strongly reiterated the outage-notification obligations of all participant generators citing several Cold Snap situations that were improperly reported. A copy of the winter 2004/2005 pre-seasonal transmittal will be posted on the ISO's website.

Peaking Gas Service

Recommendation #5

The ISO should encourage consideration of the feasibility and usefulness of having the gas utilities provide "peaking gas" capability on gas pipelines in New England. Under emergency operating conditions, peaking gas might allow the provision of gas to peaking or quick-start units enabling them to reliably provide critical operating reserves. Many details of operation and implementation would need to be resolved.

Management Response to Recommendation #5

Action Steps	Who	When
1. Conduct meetings with regional gas pipeline companies to explore the development of new gas services for gas-fired units in conjunction with potential changes to the electric market structure.	ISO	Complete March 2004
2. Solicit proposals from the regional gas pipeline companies for new products and services.	ISO	4 th Quarter 2004
3. Evaluate the necessary changes to existing market rules to take advantage of these newly proposed natural gas products and services.	ISO	TBD

During 2004, the ISO conducted numerous meetings with regional gas pipeline representatives to explore the concept of new or alternative gas products and services for gas-fired generating units.

The quick-start nature of electric peaking facilities (online within 10 or 30 minutes) presents a unique set of coordination issues. The ISO will investigate the capability of regional pipelines to deliver real-time "peaking gas" services to gas-fired peaking units. These services may include "No-Notice" or "Park and Loan"¹⁰ service through the pipeline or specific peaking arrangements made through third-party providers such as LDCs or gas marketers. The ISO will investigate any changes to existing electric market rules that will be required to allow gas-fired generators in New England to take advantage of these newly proposed products and services.

¹⁰ Park and Loan service refers to an existing interruptible gas product whereby a customer might take extra or less gas than scheduled and utilize the gas pipeline line pack as a balancing mechanism.

Dual-Fuel Assessment

Recommendation #6

The ISO should inventory dual-fuel units and their ability to burn each fuel. One focus should be to assess the regulatory barriers, if any, to operating on secondary fuels. The ISO should open a dialogue with state and local regulators about permitting of dual-fuel units. In addition, the ISO should evaluate the economic incentives to install dual-fuel capability, including whether permitting restrictions reduce those incentives.

Management Response to Recommendation #6

Action Steps	Who	When
1. Review the additional amount of capacity that could have been on-line during the Cold Snap if dual-fuel switching was 100% efficient.	ISO	Complete February 2004
2. Conduct meetings with New England air regulators to review permitting restrictions on dual-fuel units.	ISO	Several meetings have taken place to date; ongoing collaborative meetings envisioned.
3. Engage an environmental consultant to assist the ISO in its efforts to address dual-fuel issues.	ISO	Complete September 2004
4. Engage an environmental consultant to develop an inventory of air permits for all dual-fuel units. Investigate the air permit limitations on burning both primary and secondary fuel sources.	ISO	Complete August 2004
5. Establish a new operating procedure that triggers a request for all primary gas-fired dual-fuel units to switch to secondary liquid fuel oil during cold weather events.	ISO	October 2004
6. Consult with and provide status reports of all Cold Snap initiatives to the New England Governors' Conference Power Planning Committee.	ISO	Ongoing
7. Conduct site visits of both existing and potential dual-fuel units to identify what barriers exist to obtaining full dual-fuel operability.	ISO	4 th Quarter 2004

ISO has retained the services of the ESS Group, Inc.¹¹ (ESS Group), an engineering and environmental solutions consultant, to assist in the compilation of all fossil-fueled generating-station air quality permits, along with fuel-switching provisions, limitations, and constraints. Analysis of aspects of the regulatory framework that may impede or preclude dual-fuel capability has been performed. Expansion strategies and feasibility analysis have identified potential dual-fuel candidates. The final process will be to merge the results and findings of these assessments with information from site visits to candidate generation stations to identify the site-specific barriers to delivering that need to be overcome to yield more dual-fuel capability. Additionally, the ISO is identifying ways to maintain and update this information.

The ESS Group has assisted the ISO in evaluating New England’s generating capacity by fuel type, with a particular focus on units that have the capability to fire both natural gas and oil (dual-fuel units). These units provide a means of ensuring reliability by supplying operable generating capacity in the event of disruptions or constraints in the natural gas supply and delivery systems. While some units can utilize either oil or natural gas on a purely discretionary basis without limitation, many units’ air permits restrict oil burning on a twelve-month rolling basis. To help provide additional assurance of adequate generating capacity in emergency situations, the ISO is continuing discussion of the regulatory framework with New England air regulators to allow dual-fuel units to burn oil during a future gas-supply or transportation-disruption event. The ISO has developed a “Cold Weather” operating procedure to improve the efficiency of the fuel-switching process.

A review of the dual-fuel units that did not successfully make the conversion from natural gas to oil during the Cold Snap shows that up to approximately 1,000 MW of additional capacity could have been made available during the Cold Snap if certain air quality permit provisions had been more explicit. A new operating procedure has been developed to assist in triggering this fuel-switching process.

The ISO has engaged the New England Governors’ Conference Power Planning Committee along with representatives of the New England air regulators to brief them on this project’s scope of work, to seek their guidance and to provide them with status updates regarding current and future activities. The New England Governors’ Conference Power Planning Committee and the regional air regulators have provided both the ISO and the ESS Group with valuable assistance.

ICAP Rules

Recommendation #7

To increase incentives for unit availability during peak periods, the ISO should evaluate modifications to the installed capacity (ICAP) rule. These modifications might include adjusting the UCAP calculations to weigh outages during peak periods more heavily or imposing penalties on ICAP units that are unavailable during peak periods.

Management Response to Recommendation #7

Action Steps	Who	When
1. Develop economic incentives to	ISO	Complete

¹¹ ESS Group, Inc., 888 Worcester Street, Suite 240, Wellesley, Massachusetts 02482 (www.essgroup.com)

encourage greater generating availability during times of peak demand or reserve shortage conditions.		August 2004
2. Address seams issues relating to unit availability and capacity markets with other ISOs.	ISO	Ongoing

The ISO has developed both LICAP and FRM proposals¹² that provide significant incentives for generator availability during times of peak demand or reserve shortage conditions. Both proposals provide incentives for existing gas-only generators to obtain either dual-fuel capability or firm natural gas transportation contracts to improve their overall unit availability.

The ISO is closely monitoring developments in the capacity markets of both the New York Independent System Operator (NYISO) and PJM Interconnection (PJM). The proposed changes under consideration in PJM are still in the design stage, and there is a possibility that the new capacity rules may: a) take fuel diversity as a parameter determining the revenue streams for capacity providers, and b) propose new incentives for availability during times of peak demand or reserve shortage conditions. The ISO shall assess the benefits of these and alternate proposals.

Price Signals

Recommendation #8

The ISO should carefully reevaluate commitment practices and price-setting methodology to ensure appropriate price signals.

Recommendation #14

The ISO should evaluate increasing supply- offer flexibility in the real-time market. This would improve participants' ability to more accurately reflect current gas-market conditions in their offers. This, in turn, would allow electricity end-users to compete more effectively with residential heating for scarce gas resources and may also work to reduce the risk premiums reflected in gas-unit offers under extreme conditions.

Recommendation #19

The ISO should review the assumptions used to forecast forced outages during extremely cold weather. The Cold Snap experience suggests that extremely cold weather can directly cause unit failures and indirectly cause outages due to fuel unavailability. Fuel availability may be better anticipated through improved monitoring of gas pipeline status.

Recommendation #22

The ISO should further investigate out-of-merit operations during the Cold Snap. It should also evaluate rule changes necessary to reflect more fully in LMPs the cost of dispatched units.

¹² On August 31, 2004, ISO filed with FERC the Compliance Report on LICAP, Docket Nos. ER03-563-030 & EL04-102-000.

Management Response to Recommendations #8/14/19/22

Action Steps	Who	When
1. Provide the ISO forecast department with information regarding gas-fired generator transportation contracts and the capability to verify fuel nominations and scheduled volumes.	ISO	Complete August 2004
2. Provide the ISO forecast office with access to the regional interstate pipelines' electronic bulletin boards to obtain real-time operational information.	ISO	Complete August 2004
3. Based on the experiences from the Cold Snap, modify the input assumptions and forecasting/operating procedures prior to winter of 2004/2005.	ISO	Complete August 2004
4. Follow up with those generating units that experienced cold weather-related outages during the Cold Snap to ensure that remedial actions have been taken to prevent further occurrences.	ISO	Complete August 2004
5. Align the timing of the wholesale electric markets to the natural gas market during severe cold weather or equivalent emergency events.	Cold Snap Task Force	November 2004
6. Investigate allowing increased flexibility for generator offers within the energy market.	ISO	4 th Quarter 2005
7. Investigate rule changes necessary to better reflect in LMPs the cost of units dispatched out of merit.	ISO	4 th Quarter 2005

The ISO has provided its forecast office with enhanced information regarding the real-time status of all the regional gas pipelines' operating conditions. This enhanced information includes notification of pipeline constraints, critical notices, OFOs, and the capability to verify gas-fired generation fuel nominations and scheduled volumes.

The ISO forecast office has modified its unit commitment practices based on the experiences and lessons learned from system operation during the Cold Snap. This includes revising the assumptions on the availability of gas-fired and dual-fuel units and the magnitude of probable forced outages related to extreme cold-weather conditions.

The ISO and NEPOOL are developing all necessary changes to the existing market rules and manuals to implement temporary realignment of the electric market timelines during cold weather events.

The ISO will investigate the feasibility and benefits of increasing generating-unit supply-offer flexibility within the real-time energy market. This could potentially reduce problems identified

during the Cold Snap that were caused by the inability to reflect fuel-price changes in real-time offers when fuel prices are highly volatile. This action step is not available for winter 2004/2005.

The extremely high prices for natural gas during the Cold Snap and corresponding high offer prices from gas units highlighted the need for review of existing LMP-setting rules. Thousands of MW needed for reliable system operation were compensated through Operating Reserves and were seldom infra-marginal. The MMD has reviewed the existing out-of-merit analysis and updated the results.

In February 2004, the MMD conducted a general review of electric supply conditions during the Cold Snap. That review included a survey of participants who reported outages on their generating unit(s) during the Cold Snap. The MMD categorized these outages into three sub-categories; 1) equipment-related outages, 2) outages related to some type of natural gas “issue” (e.g., fuel procurement), and 3) weather-related outages. Within New England, 15 weather-related generating unit outages were reported at 10 generating stations during the Cold Snap.

In August 2004, the MMD sent a follow-up survey to those same participant generators who reported experiencing weather-related outages during the Cold Snap. Responses to this survey will document what remedial actions have been taken to prevent future occurrences of the root cause of the reported weather-related outages. The August 30th survey is entitled *ISO New England’s Follow Up Evaluation on Remedial Actions Taken to Eliminate Future Occurrences of Cold Weather Related Outages Similar to Those Experienced During the January 14-16, 2004 Cold Snap Period*. A copy of the “generic” MMD follow up survey is posted on the ISO’s website.

With approximately half of those surveyed having responded by early October, all responses indicate that unit owners took steps that are expected to eliminate the weather-related problems experienced during the Cold Snap. The ISO expects these actions to result in improved availability of resources during future severe winter weather events. Examples of these actions include: conversion of two peaking gas turbines to dual-fuel capability, addition of heaters to air handling facilities at various generating plants, and installation of improved pump seals at certain combined cycle plants.

Operating Procedure Number 5

Recommendation #9

The ISO should review and clarify OP5 economic outage documentation requirements and the criteria for evaluation and acceptance of economic outage requests. It may be appropriate to narrow the circumstances under which economic outages are granted. In addition, the ISO should clarify generator obligations, the linkage to ICAP payments, and the meaning of making “best efforts” to return from economic outages when requested to do so.

Recommendation #18

The ISO should revise the economic outage provisions of OP5 or operating practice to ensure consistency between the practices of ISO operators and the written procedures.

Management Response to Recommendation #9/18

Action Steps	Who	When
1. Revise internal system operating procedures to ensure economic outages are not granted after the defined notification deadlines.	ISO	Complete September 2004
2. Modify OP5 to tighten generator notification responsibilities with respect to economic outages.	ISO	October 2004
3. Implement a new operating procedure that will trigger the elimination and cancellation of economic outages during a projected cold weather event.	ISO	October 2004
4. Review the necessity of economic outages with the NEPOOL Markets Committee.	ISO	March 2005

The ISO is in the process of tightening the generation notification responsibilities with respect to economic outages as defined in NEPOOL Operating Procedure Number 5 – Generation Maintenance and Outage Scheduling (OP5). The ISO will restrict the circumstances under which economic outages are granted. Under the new, soon to be implemented “Cold Weather” operating procedure, economic outages will be immediately canceled based on forecast conditions (in advance of the actual cold weather). These changes should address the concerns during the Cold Snap period. In the longer term, the ISO will initiate a general evaluation of the need for economic outages and how they should be utilized by participants.

The ISO forecast office has gained access to all of the regional interstate pipelines’ electronic bulletin boards. The forecast office now has access to gas-fired generating unit fuel-nomination and scheduling information. In addition, the forecast office has obtained information concerning the contractual pipeline transportation arrangements of New England’s gas-fired generating units. Units are classified by their contractual arrangements with the pipelines with respect to holding firm transportation entitlements to liquid natural gas trading hubs. The forecast office will also be receiving automatic e-mail notifications from gas pipeline companies informing them of constraints or problems with gas delivery into and within New England. This information regarding pipeline operational status and the resulting impact on generator availability in New England will assist the forecast office in making more informed decisions during the process of reviewing and approving or disapproving requests for economic outages.

Congestion Impacts

Recommendation #10

Although congestion was not significant during the Cold Snap, additional operational concerns might arise if the system were congested during an event similar to the Cold Snap. The ISO should consider the implications of significant transmission system congestion during events similar to the Cold Snap.

Management Response to Recommendation #10

Action Steps	Who	When
1. Review existing operating procedures for clarification of transmission operation under extreme conditions.	ISO	Complete February 2004
2. Within RTEP04, assess transfer capabilities and generation fuel mix within transmission-constrained load pockets under extreme demand conditions.	ISO	Complete August 2004

The ISO has reviewed system performance during the Cold Snap and other cold weather events and has determined that transmission capabilities, such as thermal limits, are not typically constraining during such periods. This is because most of the generation is operating at near or full capacity throughout the system, and transmission line ratings are significantly higher during the winter than those ratings during the summer. Reactive power problems are also atypical during winter conditions.

The ISO has reviewed its existing operating procedures for transmission operation, allocation of operating reserve, and unit commitment within transmission-constrained load pockets. This review has concluded that the existing operating procedures are adequate to address conditions such as those experienced during the Cold Snap.

Transfer Limits

Recommendation #11

The ISO should seek to maximize available imports during critical periods. It should review procedures for establishing transfer limits during critical periods and evaluate current disincentives to scheduling imports during such periods.

Management Response to Recommendation #11

Action Steps	Who	When
1. Modify operating guides to ensure maximum transfer capabilities are utilized under both normal and emergency operating conditions.	ISO	Complete January 2004
2. Investigate dynamic re-dispatch procedures with external control areas to enable higher import/export capabilities between control areas.	ISO	2 nd Quarter 2005
3. Develop a “Best Practices” process for transmission rating and transfer capability calculations to optimize import capabilities during emergencies.	ISO	2 nd Quarter 2005

4. Investigate modifications to existing market rules regarding real-time deviation penalties.	ISO	TBD
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Prior to the winter of 2003/2004, the transmission system in Northwest Vermont was significantly weakened by the outage of the PV20 line phase angle regulator. To protect reliability of the grid, a special operating procedure was implemented. This special operating procedure reduced the New York to New England transfer capability as Northwest Vermont load increased. During the first day of the Cold Snap, transmission operations engineers from the ISO and NYISO modified the operating procedure to utilize the peaking generating units located in Northwest Vermont for contingency coverage to provide an increase in the New York to New England transfer capability. Since New York was not as dependent on gas-fired generation as New England, this enabled greater imports into New England during the subsequent days of the Cold Snap. In June 2004, the PV20 line phase angle regulator was replaced, eliminating the need for this special operating procedure.

Transmission operations engineers are currently working on two additional fronts to develop new procedures that will maximize transfer capabilities between New York and New England. First, transmission ratings procedures are being developed in New England on a “Best Practices” basis to improve interface capabilities where applicable. This effort will include the review of use of dynamic line ratings where possible. Second, it has been determined that if specific generating resources were dispatched out of merit by only a few MW on either side of the transmission interface, New England may be able to increase the resulting transfer capability by several hundred MW. The ISO will explore the development of “market redispatch” procedures to make use of this potentially large transfer capability improvement.

B. Market Timelines and Flexibility

Trading Day Timelines

Recommendation #12

The ISO should quantify the additional gas that could have been made available, if any, had gas-fired units that were ultimately committed in real time made day-ahead gas purchases and transportation nominations.

Management Response to Recommendation #12

Action Steps	Who	When
1. Determine the additional amount of capacity that could have been online if the regional gas pipelines had increased line-pack on their systems prior to the Cold Snap.	ISO	Complete March 2004

From discussions with representatives of the regional gas pipelines, combined with the Cold Snap analysis performed by LAI, the ISO has determined that up to an additional 1,200 MW could have been made available during the Cold Snap if the regional gas pipelines had increased line pack prior to the Cold Snap. Please reference the Management Response to Recommendation #2.

Recommendation #13

The ISO should investigate enhanced coordination of gas and electric trading through synchronization of the respective trading deadlines. The ISO should support efforts (e.g., of the North American Energy Standards Board, “NAESB”) to coordinate the trading days for gas and electricity. One example of better synchronization is the timing of the NYISO day-ahead market, which clears by approximately 10:00 a.m. day-ahead, before the end of the day-ahead gas trading day. Such timing might better enable day-ahead gas purchases and transportation nominations to ensure maximum gas availability in real time.

Recommendation #15

The ISO should consider how to ensure that sufficient gas-fired capacity is incented to make day-ahead gas purchases and transportation nominations. This would be complemented by any revisions to the market timelines that better synchronize the electric and gas markets.

Management Response to Recommendations #13/15

Action Steps	Who	When
1. Align the timing of the electric market with the natural gas market during severe cold weather events.	Cold Snap Task Force	November 2004

To address the market-timing issue, the ISO and NEPOOL responded by creating the Cold Snap Task Force, which provided valuable stakeholder assistance with respect to the development of several proposals that sought to advance the timelines of the wholesale electric market to provide increased coordination with the region’s natural gas market (timely) gas nomination deadline. The recommended proposal includes the rollback of the wholesale electric day-ahead market process (submittal deadline) along with performing an early resource adequacy assessment, thus providing advance notice of unit commitments to gas-fired generators. The ISO’s proposal is being fine-tuned and prepared for approval by NEPOOL. It appears that the recommended proposal can be implemented within the existing FERC-approved language of Market Rule 1. Proposed changes to the electric market timeline are targeted for implementation prior to the winter of 2004/2005.

C. ISO Operations and Implementation

Electric/Gas Operations Committee

Recommendation #16

The ISO, jointly with the Northeast Gas Association, should develop a protocol for gas pipeline/ISO communications and establish a formal coordination mechanism between the ISO and the natural gas industry.

Recommendation #17

The ISO should evaluate revisions to the NEPOOL Information Policy to allow limited sharing of confidential data as necessary for the purpose of maintaining system reliability. These revisions should allow communications with the natural gas pipeline system as necessary to ensure system reliability.

Management Response to Recommendation #16/17

Action Steps	Who	When
1. Develop a non-disclosure agreement between the ISO and the natural gas pipeline companies to assure information transfer.	ISO	Complete July 2004
2. Execute non-disclosure agreements with the regional gas companies participating on the EGOC.	ISO	4 th Quarter 2004
3. Review the NEPOOL information policy to determine the requirements that govern information sharing during the look-ahead meetings between the ISO and gas pipelines.	ISO	Complete September 2004

Establishing the appropriate mechanism to coordinate the electric and gas sectors was one of the first assignments undertaken by the newly formed EGOC. Please reference the third action step of the ISO's Management Response to Recommendation #1.

After examining the FERC's regulations,¹³ the NEPOOL Information Policy,¹⁴ Order 2000,¹⁵ the Interim ISO Agreement,¹⁶ and other documents,¹⁷ ISO counsel came to the following two conclusions. In terms of sharing of information and due to certain legal restrictions, the ISO will not be able to compel pipeline operators to provide it with information. However, the ISO can receive information from interstate pipelines that is voluntarily provided by the pipeline operator. In addition, the restrictions of the NEPOOL Information Policy make providing any information about a NEPOOL participant generator to a gas pipeline operator problematic, because such information may be classified as confidential or restricted by the NEPOOL Information Policy.

Notwithstanding the above, nothing would explicitly preclude the ISO, generators, and pipeline operators from reaching an agreement regarding the sharing of information needed to enhance the proper functioning of New England's energy systems. Such an agreement would address the need

¹³ Specifically, we examined the pertinent parts of chapter 18 of the Code of Federal Regulations.

¹⁴ The NEPOOL Information Policy is *available at* http://www.iso-ne.com/NEPOOL_Information_Policy/NEPOOL_Information_Policy_3-7-2003.pdf (last visited Jun. 7, 2004).

¹⁵ Regional Transmission Organizations, Order No. 2000, 65 Fed. Reg. 809 (2000), FERC Stats. & Regs. ¶ 31,089 (1999), *order on reh'g*, Order No. 2000-A, 65 Fed. Reg. 12,088 (2000), FERC Stats. & Regs. ¶ 31,092 (2000), *appeal dismissed*, *Public Utility District No. 1 of Snohomish County, Washington v. FERC*, 272 F.3d 607 (D.C. Cir. 2001) (hereinafter "Order 2000").

¹⁶ The ISO Agreement is *available at* http://www.iso-ne.com/FERC/filings/Interim_ISO_Agreement/Interim_Independent_System_Operator_Agreement_-_07-01-97.pdf (last visited Jun. 7, 2004).

¹⁷ Including the Standards of Conduct for Interstate Pipelines with Marketing Affiliates, 18 C.F.R. § 161 (2003), which deal mainly with the relationship between pipelines and their affiliates and have no relevance to the issues at hand; and the Standards of Conduct for Public Utilities, 18 C.F.R. § 37.4 (2003), which similarly deal with information obtained by transmission providers engaged in wholesale merchant functions from their customers.

for confidentiality of the parties concerned, the kind of information that may properly be shared and the methods for sharing and protecting such information, taking into account the requirements of the NEPOOL Information Policy, FERC Standards of Conduct, and antitrust issues. The ISO has developed and proposed a non-disclosure agreement to govern its interactions with the gas pipeline companies.

Regulatory Communications

Recommendation #20

The ISO should review established procedures and protocols for communicating with state officials and announcing unusual emergency actions and should engage state agencies to refine these procedures.

Management Response to Recommendation #20

Action Steps	Who	When
1. Review and revise, as necessary, the established procedures and protocols for communicating with state officials and regulatory agencies during periods of high demand or abnormal conditions.	ISO	Complete May 2004

Prior to the 2004 summer season, the ISO's Corporate Communications Departments held a stakeholder meeting for the purpose of reviewing NEPOOL Operating Procedure Number 4 – Action During a Capacity Deficiency, NEPOOL Operating Procedure Number 7 – Action in an Emergency, and the ISO's current event communications plan with designated emergency contacts from each of the New England states, FERC, the North American Electric Reliability Council (NERC), state emergency management offices and NEPOOL communications staff. The session was also designed to receive stakeholder comment and input. A full review of the existing procedures and protocols has been completed, and documents have been revised as necessary.

D. Market Monitoring and Analysis

Lessons Learned

Recommendation #21

The MMD should seek to incorporate lessons learned from its review of the Cold Snap events into the monitoring of future events, including evaluation of participant explanations of behavior under similar circumstances.

Management Response to Recommendation #21

Action Steps	Who	When
1. Incorporate “lessons learned” from the Cold Snap into the MMD's review of future events.	ISO	Complete May 2004

The MMD conducted a significant review of participant explanations of their performance during the Cold Snap. Through this effort, the MMD has improved its understanding of the regional

natural gas markets and has enhanced its understanding of electric and gas market interdependence. MMD procedures have been revised to allow more timely updates to unit reference prices, especially during times of extreme fuel price volatility. The MMD is also engaged in an ISO-wide effort to improve electric market operation and competitiveness during future cold weather events.

Regulatory Information Exchange

Recommendation #23

The ISO should continue to improve coordination with regulators and other monitoring entities to ensure adequate monitoring and information exchange during critical periods.

Management Response to Recommendation #23

Action Steps	Who	When
1. Review and update, as necessary, information transfer with FERC's Office of Market Oversight and Investigations and state and other regulators.	ISO	Complete March 2004

The MMD has completed its review of information transfer with FERC's Office of Market Oversight and Investigations and has strengthened ties along with revising information-sharing protocols. A similar review is being conducted regarding information-sharing protocols with state regulators. Additionally, ISO staff has met with representatives of the New England Attorneys General staff to discuss related Cold Snap issues, on-going information exchange, and collaboration efforts.

IV. Additional ISO Activities to Address Cold Snap Issues

As a result of the proliferation of gas-fired generating capacity within New England and the events surrounding the Cold Snap, the ISO continues to take the steps necessary to reliably plan for and address winter-period availability issues surrounding gas-fired generating units. The following is a list of actions that the ISO has completed or are underway:

Previous ISO Gas Studies

The ISO has periodically evaluated the outlook for supply and transportation of natural gas into and within New England from the standpoint of bulk power system reliability. These evaluations have provided regional stakeholders, reliability planners, and regulatory agencies with important insights that can help them respond effectively to the gas delivery challenges facing New England's electric generation sector. As indicated in the ISO report prepared by LAI entitled *Steady-State and Transient Analysis of New England's Interstate Pipeline Delivery Capability, 2001-2005* dated January 2002, analysis was performed to gauge the impact on gas deliveries to New England's electric generation sector with respect to serving the coincidental winter demand from traditional gas utilities. Impacts resulting from postulated gas-side contingencies were also evaluated. Key findings identified the potential "generation-at-risk," subsequent upstream and downstream effects, along with response time required to replace lost generation.

Membership on the NERC Gas/Electric Interdependency Task Force

To address reliability concerns resulting from interdependence between gas pipelines (and gas LDCs) and the electric system, NERC's Planning Committee formed the Gas/Electric Interdependency Task Force (GEITF) in February 2003. Recommendations to mitigate any negative reliability impacts that result from any interdependence were to be provided to the NERC Planning Committee and the NERC Board of Trustees at the conclusion of the GEITF's activities. Along with the Northeast Power Coordinating Council (NPCC), the ISO is a member of GEITF.

The GEITF prepared a list of seven draft recommendations for NERC's consideration to mitigate reliability impacts from the interdependence between the gas pipeline industry and the electric industry. The seven NERC recommendations along with corresponding ISO activities are identified below.

Recommendation #1: NERC regions should include in their regional assessment program a review of the impact of any fuel transportation infrastructure¹⁸ interruption that could adversely impact electric system reliability.

ISO Response: The ISO has conducted extensive hydraulic studies¹⁹ of the regional interstate pipeline transportation systems and corresponding gas infrastructure. Assessments were made using both steady state and transient analysis to determine the impacts that hypothetical gas-side contingencies could have upon electric system reliability. In July 2003, to identify fuel diversity issues, the ISO published a White Paper entitled *Natural Gas and Fuel Diversity Concerns in New England and the Boston Metropolitan Electric Load Pocket*.

In July 2003, the ISO along with representatives from the Independent Electricity Market Operator (IMO-Ontario), PJM, NYISO, and NERC published the results of their joint gas-side infrastructure assessment entitled *Multi-Region Assessment of the Adequacy of the Northeast Natural Gas Infrastructure to Serve the Electric Power Generating Sector*.²⁰

Recommendation #2: 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.

ISO Response: The ISO and the regional natural gas industry, working through the Northeast Gas Association, has formed the Electric/Gas Operations Committee (EGOC). The EGOC is currently developing protocols for communication between the electric and gas sectors for both normal operations and emergency situations. Compliance with the NEPOOL Information Policy, FERC Standards of Conduct, and antitrust law will be maintained.

¹⁸ The focus of the GEITF was on gas transportation.

¹⁹ In January 2001, ISO published the report entitled *Steady-State Analysis of New England's Interstate Pipeline Delivery Capability, 2001-2005*. In January 2002, ISO published the report entitled *Steady-State and Transient Analysis of New England's Interstate Pipeline Delivery Capability, 2001-2005*.

²⁰ Due to confidentiality restrictions contained within the non-disclosure agreements signed between the electric and gas sectors, this study has not been disseminated into the public domain.

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.

ISO Response: The ISO and the regional gas industry utilities, communicating through the EGOC, are working to improve infrastructure outage coordination. It is envisioned that information about all planned gas-side maintenance (long-term), occurring at either the pipeline or LDC level, could be disseminated to the ISO to identify potential fuel delivery curtailments to the electric sector. Short-term maintenance requirements will be extracted from the natural gas transmission company's electronic bulletin boards. Compliance with the NEPOOL Information Policy, FERC Standards of Conduct, and antitrust law will be maintained.

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

ISO Response: The ISO currently participates in NERC's Standards Authorization Request process as well as the Reliability Assessment Subcommittee. The ISO is actively participating in the development of this reliability standard.

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.

ISO Response: The ISO participates in the NPCC CP-10 Working Group's - Collaborative Planning Initiative Objective. The ISO is currently proposing changes to the existing scope of work to include fuel infrastructure contingencies.

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.

ISO Response: The ISO supports this GEITF recommendation.

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.

ISO Response: The ISO and the regional gas industry, working through the EGOC, are planning to conduct common-mode training of both forecast and operations personnel. The ISO has already held two in-house training sessions on natural gas supply, transportation, distribution, and markets. During the spring of 2004, approximately 100 ISO staff attended these natural gas training sessions. An executive level tutorial was also conducted for ISO Senior Staff in early August.

The ISO has also participated in the GEITF and assisted in the development of the seven recommendations. These seven recommendations were approved by the NERC Board of Trustees on June 15, 2004. NERC has begun implementation of these recommendations.

Database of Gas-Fired Generator Pipeline Transportation Contracts

The ISO has procured a database that identifies most of New England's gas-fired generation pipeline transportation contracts. This database is organized on a geographical basis. Pipeline capacity contracts are classified by state, pipeline, lateral versus mainline capacity, receipt and delivery points, and whether the generating plant is directly connected to the interstate pipeline or

whether its contract is with an LDC. The type of transportation contract, i.e., primary firm, secondary firm, or interruptible is also identified. This database is being used to assist ISO operations, primarily the forecast department, in their understanding and identification of gas-fired units that would be subject to fuel-delivery constraints in the event that regional pipelines or LDCs issue notification of pending capacity constraints (critical notices, OFOs, etc.).

The ISO has gained access to the regional pipelines' electronic bulletin board systems. The matching of pipeline operational restrictions to specific plants now enables the ISO to conduct a meaningful conversation with power plant operators as to how gas-side constraints affect power plant operation and thereby increase the accuracy of the forecasting process along with the development of the subsequent "next-day" operational plan.

New England-Specific Natural Gas Supply Study

The ISO is conducting a study of natural gas supply relative to the requirements for natural gas for New England's power generators. While this study focuses on the prospects for gas supply availability for those supply basins that have been the traditional sources of gas supply to the Northeast, it will also present information about other supply basins that may serve to displace traditional Northeast supplies.

The analysis will focus on recent and expected trends for gas supplies in traditional supply areas, the prospects for additional supplies from recently developed supply basins, the prospects for incremental future supplies, and other supply-side options such as LNG. The study is to assess the adequacy of the availability of gas supply into the Northeast region given the existing gas transportation infrastructure. This study will address a number of questions concerning gas supply to the Northeast, including:

- What are the near-term prospects for gas supply from existing producing areas?
- What are the recent trends in key supply indicators such as gas well completions, well productivity, and productive capacity?
- Can a major increase in supply be expected in response to higher gas prices in the near term as has been the case in the past twenty years?
- What are the prospects for increased supplies off Nova Scotia? Will recent drilling results discourage additional exploration in this area? If so, what are the near-term prospects for available supplies and where will the supplies come from?
- What is the prospect for additional LNG facilities in the Northeast?
- What are the likely sources of LNG for each of these projects?
- What is the expected timing for development of major new gas supply areas such as the Arctic and Mackenzie Delta?
- What is a reasonable timeline for development of new supplies for planning purposes?
- What is the projected price range at which new supplies will be economical?

The ISO expects delivery of this New England-specific gas supply assessment in draft form in mid-October and will produce a final report by late-October 2004.

V. Conclusion

The ISO supports the findings and recommendations of the MMD Final Cold Snap Report and has taken significant steps to improve reliability in New England as a result of lessons learned during and subsequent to the Cold Snap. The action steps presented in this Management Response are the result of months of coordinated review and planning involving ISO staff, NEPOOL participants, state utility and environmental regulators, gas industry representatives, and the New England Governors' Conference Power Planning Committee.

The action steps taken by the ISO and New England asset owners for winter 2004/2005 are expected to improve supply-side resource availability in New England by at least 2,000 MW over the performance during the 2004 Cold Snap.

Longer-term action steps have been identified to improve import capabilities with neighboring systems and to develop electric market incentives encouraging greater unit availability. Responses to these incentives might include more dual-fuel generating capacity in New England, and to increased use of firm-gas transportation arrangements for gas-only generating units.

The ISO will monitor the implementation of these identified actions and provide updates to the New England Governors' Conference Power Planning Committee, state regulators, and the NEPOOL participants.