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New York State Reliability Council

10 Year Anniversary 1999-2009



BROOKLYN BRIDGE
PHOTO

A Decade of Promoting a Reliable
Electric Power System in New York State

2007-2008 Biennial Report

[Inside Front Cover]

Our Mission

To facilitate the maintenance and enhancement of the reliability of New York State's electric power system.

NYSRC At-A-Glance

Approved by FERC: 1998

Began Operations: 1999

Activities:

- Develops Reliability Rules
- Assesses Compliance with the Reliability Rules
- Establishes Statewide Installed Capacity Requirements
- Assesses Future Reliability, Adequacy and Security
- Governed by a 13-member Executive Committee

Our Vision

A professional organization managed by a team of experts who are dedicated to achieving excellence in the promoting and preserving of reliable electricity service for the 19 million residents and businesses of New York State.

Photo Acknowledgements

Consolidated Edison Co. of New York – Photo of the Brooklyn Bridge – Front Cover

Jennifer Harvey, New York State Energy Research & Development Agency – Photo of the Maple Ridge Wind Farm in the Tug Hill region of New York – Page __

George C. Loehr - Photo of the Empire State Plaza in Albany – Page ____

Message from the Chairman

The mission of the New York State Reliability Council (NYSRC) is to promote and preserve the reliability of the bulk electricity grid in New York State. This charge includes developing, maintaining, and from time-to-time updating Reliability Rules with which the New York Independent System Operator (NYISO) and all market participants must comply. In fulfilling its mission, the NYSRC works in close conjunction with the NYISO.

During 2007 and 2008, the NYSRC continued its cooperation with the NYISO and various state agencies in identifying potential reliability impacts of environmental initiatives. The integration of wind energy into the New York State resource mix was a particular focus of NYSRC's efforts. We also worked with state agencies to ensure that reliability would be included as a critical requirement in the development of the State Energy Plan. New reliability rules were proposed, reviewed and adopted, and conformance with existing rules was monitored and confirmed. In conjunction with the Northeast Power Coordinating Council (NPCC), we continued to explore "defensive strategies" to protect New York State from power system disruptions which originate outside New York – like the 2003 Blackout.

Since the bulk electricity system in New York is part of a vast synchronous interconnection (or "transmission grid") stretching from the Canadian Maritimes to Florida and from the Atlantic Ocean to the Rocky Mountains, joint interregional studies of the overall system are critically important to reliability. During 2008, NYSRC worked closely with NPCC to restart such efforts. We also continued our long-term participation in the development and review processes for reliability standards in both the NPCC and the North American Electric Reliability Corporation.

New York has always been in the forefront in the development of probability methods for assessing resource adequacy. During 2007 and 2008, NYSRC continued to determine the annual installed reserve margin for the New York electric power system, and the ongoing refinement of its methodology.

The NYSRC will celebrate its tenth anniversary during 2009. We are proud of our accomplishments in helping to maintain the reliability of the electric power system for the citizens of New York State over the past decade, and look forward confidently to the future. As Chair, I would like to personally express my thanks to the members of the Executive Committee and the various entities they represent. I especially want to thank the chairs and members of the several subcommittees and task forces, our legal counsel, and our superb consultants – without their tireless efforts, our job would be more difficult if not impossible. I also extend the NYSRC's appreciation to the management and staff of the NYISO, with whom we work so closely and effectively. Finally, our thanks are due the many individuals from other organizations who have rendered much assistance to us; in particular, we are grateful to the employees of the New York State Public Service

Commission, the New York State Energy Research and Development Authority, and the NPCC.

George C. Loehr

Chairman, New York State Reliability Council

A Decade of Promoting Reliability

The New York State Reliability Council (NYSRC) celebrates its ten year anniversary this year, having launched operations in May 1999. Formation of the NYSRC was approved by the Federal Energy Regulatory Commission as part of the comprehensive restructuring of the competitive wholesale electricity market in New York State. Under the restructuring, the New York Power Pool was replaced by the New York Independent System Operator (NYISO) as the entity with the primary responsibility for the reliable operation of the State's bulk power generation and transmission system. The NYISO also assumed responsibility for administration of the newly established competitive wholesale electricity markets.

We are an independent not-for-profit organization dedicated to a mission of promoting and enhancing the reliable and efficient operation of the New York bulk electricity system. This system consists of hundreds of generating units and thousands of miles of high-voltage transmission lines. Development of a reliable supply of electricity that meets New York's growing needs is a foundation of the quality of life. New York households and businesses count on the electric industry to "keep the lights on." Reliability is a necessity for electricity markets and vital for our economy.

Activities of the NYSRC are governed by a 13-member Executive Committee. Nine members come from key sectors of New York's electric industry: Transmission Owners (six members), wholesale sellers (one member), industrial and large commercial consumers (one member), and municipal electric systems and cooperatives (one member). The remaining four NYSRC members are independent members with no affiliation with any sector of New York's electric industry. Each member of the NYSRC Executive Committee is required to have substantial knowledge and/or expertise in the reliable operation of bulk power electric systems. The Executive Committee sets high standards for the organization's subcommittees and working groups.

Many lessons were learned during our first decade of NYSRC operations. Our mission was underscored by a power system collapse in August 2003 that originated in the Midwest and affected much of the Northeast and Midwestern U.S. and southern Canada. This provided the opportunity for NYSRC to step back, assess where we stood, and evaluate what course we would follow to tackle the challenge of minimizing the impact on New York of a future system disturbance that occurs outside of New York, as what happened in 2003. The NYSRC formed a working group to explore the feasibility of implementing "defensive strategies" that commenced its activities immediately following the events of the 2003 Blackout. The objective of this initiative is to explore the potential for mitigation of the impact of major system disturbances on New

York's electric power system, with particular emphasis on events originating outside of New York. The NYSRC also recognized the importance of continuing to actively participate in the North American Electric Reliability Corporation (NERC) standard development program to do what we could to maintain appropriate reliability standards in North America and, in particular, prevent the weakening of those reliability standards which can impact the reliability of the New York bulk electric grid.

The NYSRC is pleased with all that has been achieved since inception and is committed to support the reliability of the New York power system. We are appreciative of the collaborative relationships we have established with the Northeast Power Coordinating Council (NPCC) and NERC, and state government agencies such as the New York State Energy Research and Development Agency (NYSERDA), the New York State Department of Environmental Conservation (NYS DEC), and the New York State Public Service Commission (NYS PSC). We are especially proud of our close relationship with the NYISO throughout the past ten years.

Our Many Roles

The NYSRC has three primary roles to achieve its mission. First, the NYSRC develops reliability rules that are more stringent or specific than NPCC and NERC standards and criteria that are necessary to meet the special requirements of New York's bulk electricity grid. Second, the NYSRC assesses NYISO and New York market participant compliance with these reliability rules. Finally, the NYSRC is responsible for adopting statewide installed capacity requirements. There are three subcommittees reporting directly to the NYSRC Executive Committee that support all facets of these roles.

1. The Reliability Rules Subcommittee oversees and manages the review, development, and modification of NYSRC Reliability Rules to maintain or enhance the reliability of the New York bulk electricity grid.
2. The Reliability Compliance Monitoring Subcommittee oversees and manages the NYSRC compliance monitoring process, develops procedures for measuring and documenting compliance, and assesses compliance with the NYSRC Reliability Rules.
3. The Installed Capacity Subcommittee manages and oversees the development and analysis of studies related to the NYSRC's adoption of annual statewide installed capacity requirements for the New York power system.

The industry sectors and independent members represented on the NYSRC Executive Committee are also represented on these subcommittees, as are NYSRC consultants and representatives of the NYISO and NYS PSC staffs. Collectively, subcommittee members provide expertise in the planning and operating aspects of the reliable operation of the New York bulk electricity system.

In 2007, the NYSRC conducted its second bulk power transmission system workshop. Over 135 people from the NYISO and market participants attended this very successful workshop. A second resource adequacy workshop was also held in 2007.

We encourage you to visit our Web site, www.nysrc.org. It includes proposed NYSRC Reliability Rules for which comments are requested, meeting schedules and meeting materials, and other useful information.

Supporting New York State's Renewable Resource and Environmental Goals

The State of New York is aggressively establishing initiatives and regulations to increase the percentage of electricity produced from power plants that run on renewable fuels and to develop new environmental standards to control greenhouse gas emissions. Collectively, these goals present several challenges that can affect the reliability of the electric power system.

State policies to increase renewable energy production have encouraged the introduction and expansion of wind power projects in New York State. Based on the pace of development of wind projects, wind can be expected to become an increasingly important resource in the years to come. In 2008 there was a total of 380 MW of wind-powered generation in New York. It is projected that by the end of the 2009, 825 MW wind generation will be added, providing a total of 16 wind-powered generation locations in Upstate New York. Wind developers are further planning to install an additional 1,750 MW of wind capacity between 2010 and 2014, 950 MW of which will be located on Long Island.

Because of the intermittent nature of wind, the currently projected wind power capacity factor of wind facilities, on average, during the summer peak period is just 11%. As a direct result of this very low capacity factor, the NYSRC projects increases in statewide installed margin reserve (IRM) requirements as more wind projects become operational, in order to maintain the required level of New York reliability.

New environmental standards will likely have significant impact on future system reliability because of their potential to affect the operation and availability of fossil fueled generating plants in New York State. The NYS DEC enacted regulations during 2008 to implement the market-based Regional Greenhouse Gas Initiative (RGGI) which, beginning in 2009, will seek to limit CO₂ emissions from fossil fueled generators in ten member states. The use of RGGI emission allowances will likely become a power system reliability issue.

A second environmental initiative, the Clean Air Interstate Rule (CAIR), is focused on bringing air quality in New York and other states into compliance with National Ambient Air Quality Standards for ozone. Ground level ozone is the product of hydrocarbon and NO_x emissions and sunlight. Fossil-powered generating stations are the largest source of NO_x emissions in New York State and strategies for the control of ozone will likely focus on the reduction of NO_x emissions from these power plants. Although specific plans for the reduction of ambient ozone remain under development and are not expected to be effective

under after 2009, it is more than likely that rigorous NOx emission control requirements will emerge from the regulatory process that will impact reliability.

During 2008, the NYSRC closely monitored these important environmental initiatives because of the potential risks to New York system reliability when these regulations are implemented. As a part of this effort, the NYSRC initiated a collaborative effort to exchange information on these pending regulations. Accordingly, we formed an ad hoc working group – composed of NYS DEC, NYS PSC, NYISO, NYSEDA, and NYSRC representatives – that provides a forum to receive detailed updates concerning the status of these regulations and to communicate potential reliability impacts to state policymakers.



Developing NYSRC Reliability Rules

NYSRC Reliability Rules define the reliability requirements to provide for reliable operation of the New York bulk electricity grid. They apply to the NYISO and market participants that operate, plan, and use the New York bulk power system. The NYSRC Reliability Rules include requirements that are more stringent or more specific than NERC and NPCC standards and criteria that are necessary to meet the special reliability needs of New York's electric power system.

The NYSRC Reliability Rule development process is open to all interested parties. Consistent with this open process, drafts of proposed reliability rules can be viewed on the NYSRC Web site and comments from the NYISO, market participants and other entities within the industry are considered. Recommendations from these parties are encouraged and carefully considered. Any entity may propose new or revised Reliability Rules. The Reliability Rules Subcommittee (RRS) manages the NYSRC Reliability Rule development process.

We are an active participant in the development of NERC and NPCC standards and criteria. An important part of our participation is to ensure that NYSRC Reliability Rules are consistent with any new NERC and NPCC standards and criteria that are developed and adopted, and make any modifications if necessary. During 2007 and 2008 we continued to review NERC standards under development and prepare comments and, as a member of the NERC Registered Ballot Body, voted on a number of proposed standards. An important focus is to ensure that future NERC reliability standards continue to maintain adequate reliability and will not result in weakening of present North American reliability standards, thereby threatening New York reliability interests. As an example, in December 2007, through its RRS chairman, NYSRC sponsored a revision of an existing NERC standard to require that determination of operating transfer limits consider common mode contingencies that result in loss of two or more (multiple) elements. NYSRC Reliability Rules and NPCC criteria now meet this requirement. However, without this proposed strengthening of this NERC standard, we are concerned that if this type of contingency event occurred in a region outside New York, New York electricity system reliability could be adversely impacted – as was the case during the 2003 Blackout. NPCC also supports this change. During 2008, this proposal was reviewed and comments received within the NERC standard development process.

Another priority of RRS in 2007 and 2008 was to evaluate the impact of expanding environmental regulations on the need for new Reliability Rules.

During 2007 and 2008, we adopted 12 new and modified Reliability Rules. Also adopted during this period were 13 new and modified measurements. One or

more measurements are associated with each NYSRC Reliability Rule; measurements identify specific NYISO and market participant requirements and actions for complying with the related Reliability Rule. By the end of 2008, the NYSRC maintained a total of 52 Reliability Rules and 58 measurements. The NYSRC's Reliability Rules and measurements can be found on its Web site.

Assessing Compliance with NYSRC Reliability Rules

Compliance monitoring is the process the NYSRC uses to assess, investigate, evaluate, and audit compliance with the NYSRC Reliability Rules. This process is implemented primarily through an annual NYSRC Reliability Compliance Program developed and administered by Reliability Compliance Monitoring Subcommittee (RCMS). In addition to this Program, the NYSRC initiates special compliance reviews from time to time.

RCMS directly monitors NYISO compliance with those Reliability Rule requirements for which the NYISO is directly responsible for compliance. The NYSRC relies on the NYISO to monitor compliance for those Rules for which market participants have compliance responsibility. RCMS provides oversight with respect to these NYISO compliance reviews.

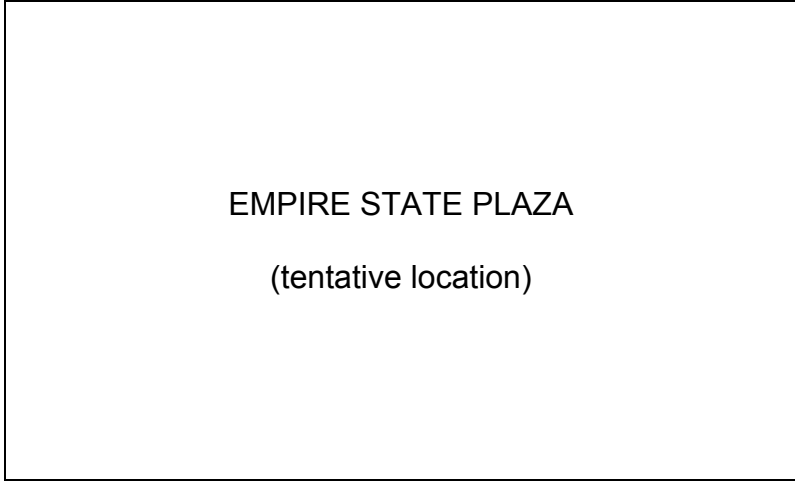
If non-compliance by the NYISO is identified by the NYSRC, mitigation plans and corrective actions are developed to achieve compliance. In addition, when a non-compliance finding is made, a letter reporting non-compliance is sent to the NYISO and to other appropriate entities. The NYSRC also provides oversight review of NYISO compliance with NERC and NPCC standards, which are separately monitored and assessed by NPCC.

In 2007, NYISO and market participant compliance with 33 measurements was monitored through the NYSRC Reliability Compliance Program; in 2008 compliance with a like number of measurements was monitored. We are pleased that the NYISO and the market participants were in full compliance with every one of these measurements.

In 2008, a special compliance review was conducted by RCMS. The NYISO reported to RCMS that it had identified a Reliability Rule violation by a market participant. This violation stemmed from the submission of incorrect outage data to the NYISO in 2004 which adversely impacted NYSRC reliability studies and NYISO market operations. A RCMS investigation of this violation led to a series of recommendations to the NYISO for improving its procedures for outage data reporting and review.

The NYSRC Reliability Rules require the NYISO conduct annual long term adequacy and reliability assessments of New York power system. The NYSRC concluded that, based on the 2007 and 2008 assessments, the New York power system, as currently planned, is in conformance with the NYSRC Reliability Rules.

During 2008, the NYSRC encouraged the NPCC to focus on the need to participate in joint interregional transmission planning studies for assessing NPCC reliability as well as reliability within regions interconnected with NPCC. The primary purpose of these studies is to ensure that system changes in these regions do not threaten NPCC and New York reliability. We will be monitoring an interregional study that is planned to be completed in 2009.



EMPIRE STATE PLAZA
(tentative location)

Establishing Installed Capacity Requirements

Another important responsibility assigned to the NYSRC is the establishment of the annual statewide installed capacity requirement for the New York power system. The amount of generating capacity that must be in place is based on ensuring an acceptable level of reliability. The Installed Capacity Subcommittee (ICS) conducts reliability studies for determining and setting statewide installed capacity requirements. These studies utilize state-of-the-art probabilistic computer modeling techniques that calculate the probability of losing customer load in the event of insufficient capacity. The statewide installed capacity requirement is implemented by the NYISO. In accordance with NYSRC reliability requirements, the NYISO establishes New York load serving entity capacity requirements as well as locational capacity requirements for New York City and Long Island.

For many years, the New York power industry has pioneered the application of probability methods for capacity planning, including the development of computer models, reliability evaluation techniques and methods, and resource adequacy criteria. Studies for establishing statewide capacity requirements using probabilistic techniques go back to the early days of the New York Power Pool during the early 1970's. During 2007 and 2008, we continued to make significant progress at improving capacity and load modeling representations. This included the consideration of two emerging energy issues that have the potential of impacting IRM requirements: the growing capacity of wind generation and environmental initiatives.

After having adopted installed reserve margin (IRM) requirements of 18.0% for the period between 2000 through 2006, in 2007 the NYSRC reduced the required IRM to 16.5%, which was then further reduced to 15.0% in 2008. These IRM reductions resulted from improved availability trends of New York's generating units and increases in transmission capability and availability. Variations of required IRM levels from year to year such as these do not increase or decrease New York electric system reliability; the amount of IRM required for a given year is designed to meet a fixed level of reliability that is mandated by Reliability Rules.

A notable addition in our IRM study transmission models was the Neptune HVDC submarine cable which was energized during the summer of 2007. This 600 MW cable connects Long Island and New Jersey. In addition to this new HVDC cable there were improvements in the transmission capability of the Dunwoodie-South transmission interface in Westchester. These improvements increased the ability of the system to transfer capacity and contributed to the IRM decreases in 2007 and 2008.

Studies conducted in 2008 for the 2009 capability year, however, resulted in an IRM increase from 15.0% to 16.5%. Projections of decreased availability of New York's power plants and a significant increase of wind capacity were largely responsible for this 1.5% increase.

Although there had been a trend of improved availability for the New York electric system's fleet of power plants for several years prior to 2007, during 2007 generating unit forced outage rates, on average, increased. This led to a lower power plant availability projection for 2009. A joint study by the NYSRC and NYISO will be conducted during 2009 to analyze these outage rate trends.

The second factor which was responsible for the increased IRM in 2009 was the recognition of new wind generation capacity. It is projected that by the end of 2009 there will be a total capacity of approximately 1,200 MW of wind capacity in New York. This represents an increase of 825 MW since the 2008 capability period. Our studies developed new wind generation models, which recognized the low capacity factor performance of this type of capacity.

The 2009 IRM Study also examined the RGGI and CAIR environmental regulations that are presently being developed by environmental regulators in New York and other states, that, when implemented, may impact IRM requirements. A NYISO analysis on the implementation of these regulations concluded that neither initiative will impact the 2009 capability year IRM requirement, although our studies have shown that both initiatives have the potential to cause substantial increases in statewide IRMs in later years.

In 2008 the NYISO evaluated the implementation of a "Forward Capacity Market" (FCM) to help address the need for an adequate power supply into the future. Under a FCM, auctions would be held to purchase resources to meet future capacity needs. This initiative will require the projection of IRMs several years into the future. During 2008 we prepared a study scope to conduct such an IRM analysis, and will perform an initial study during 2009 to assist the NYISO in its implementation of the FCM program.

Protecting the New York Power System from Disturbances Originating Outside of New York

A NYSRC initiative to explore the feasibility of implementing defensive strategies that commenced immediately following the August 2003 Blackout, continued during 2007 and 2008.

A NYSRC Defensive Strategies Working Group was formed in 2003 to explore the mitigation of major system disturbances impacting the New York electric power system. The Working Group is comprised of representatives of the New York Transmission Owners, NYISO, NYS PSC Staff, NPCC, and members of the NYSRC Executive Committee. NPCC's representation includes a member of a NPCC ad hoc working group that is charged with conducting dynamic studies related to the 2003 Blackout, including testing of an under frequency load shedding program.

Our Accomplishments

During 2007 and 2008, the Working Group closely monitored NPCC's under frequency load shedding studies because this program forms the base upon which additional defensive strategies can be built. Based on recent NPCC studies, this program will be modified to provide additional steps for load shedding. As part of this work, the Working Group gained awareness of "coherent generation groups" which are a driver in the formation of electrical islands as a result of a major disturbance.

Given that island formation is likely during major disturbances, any defensive strategy must be designed to facilitate an organized response to a loss of synchronism condition, as opposed to breaking up the system in an ad hoc manner. Toward this end, the Working Group has reviewed basic transmission system protection concepts as well as loss of synchronism protection concepts. In addition, the Working Group has started a series of presentations by major transmission protection system vendors in order to understand present state-of-the-art systems and their potential application in New York.

Our Challenges Ahead

During 2009 the Defensive Strategies Working Group will continue to monitor and provide input to NPCC blackout studies. This task involves evaluation of various possible mitigation measures to improve the ability of the NPCC member systems to withstand a major system disturbance originating from a wide range of initiating conditions. The Working Group participation will ensure that the

interests of the New York electricity grid are reflected in these studies, as well as to develop concepts that may uniquely apply to New York.

A future challenge is to develop defensive strategies that work in concert with and augment the NPCC under frequency load shedding program so as to make the New York power system more robust with regard to major disturbances that may arise due to a variety of causes, including: (1) future tightening of the Eastern Interconnection coupled with shrinking system inertia; (2) "beyond criteria events" (including terrorist attacks) within New York; (3) "beyond criteria events" beyond New York, but within the NPCC, and (4) events in neighboring regions, particularly if these systems are allowed to operate to lower reliability requirements because of weaker NERC reliability standards. The major challenge is to enhance reliability of the New York bulk electricity grid without compromising its security.

Advancing Reliability into the Future

We are confident that a diligent awareness of longer term reliability trends – and taking corrective actions as necessary – will lessen the risk of major electrical system disturbances. However, no single entity can fully protect electricity system reliability. State and Federal governments, the NYISO, and market participants must constantly be alert to the impact on reliability of governmental actions, market rules and market participant actions. Open electric markets, cleaner air, and more renewable resources are laudable goals. Unfortunately, each presents the challenge of retaining the required level of electricity grid reliability. We hope that the actions we take will produce valuable information and provide an important perspective from the viewpoint of reliability, by (1) broadening the transparency and understanding of reliability issues, (2) working together toward solutions that fairly balance the priorities of market participants without jeopardizing electricity system reliability, and (3) enhancing awareness of private infrastructure owners and related support industries of the necessity to be attentive to the reliability requirements within which they must operate, and to offer alternative solutions if and when those requirements are felt to be overly burdensome.

The Obama Administration's priorities include a national cap and trade program that would reduce U.S. greenhouse gas emissions from fossil fuel plants and other sectors of the economy. There are numerous proposals of cap and trade proposals that have been introduced in Congress. We will be assessing the risk to reliability of these proposals as they are more clearly defined.

We support the PSC, U.S. Department of Health & Human Services, and the Department of Homeland Security in establishing effective lines of communication between the public and private sectors and encouraging preparedness planning among the private infrastructure owners to combat the electric industry impacts from a widespread pandemic.

[Inside Back Cover]

New York State Reliability Council Executive Committee Members

EXECUTIVE COMMITTEE PHOTO

(tentative)

George C. Loehr ... *Chairman, Unaffiliated Member*

Michael Mager ... *Vice Chairman, Industrial and Large Commercial Consumers
Sector*

Richard J. Bolbrock ... *Municipals & Electric Co-Op Sector*

Timothy R. Bush ... *Wholesale Sellers Sector*

William H. Clagett ... *Unaffiliated Member*

Curt J. Dahl ... *Long Island Power Authority*

Thomas C. Duffy ... *Central Hudson Gas & Electric Corporation*

Bruce B. Ellsworth ... *Unaffiliated Member*

Joseph C. Fleury ... *New York State Electric & Gas Corporation/Rochester Gas &
Electric Corporation*

Joseph J. Hipius ... *National Grid, USA*

A. Ralph Ruffano ... *New York Power Authority*

Mayer Sasson ... *Consolidated Edison Company of NY*

George E. Smith ... *Unaffiliated Member*

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