SUMMARY OF LESSONS LEARNED FROM 2006-07 IRM STUDY

LESSON	ACTION	DATE	POLICY 5 ITEM	TASK FORCE
1. Schedule	Review study timeline and avoid changes to data after deadlines.		2.2 Timeline	
2. Sensitivity Cases	Improve procedure for conducting sensitivity cases.		Expand section 2.1 to include unified methodology	
3. Defining Tan 45 Anchor Point	Methodology for defining TAN 45 point needs to be defined mathematically.		Expand section 2.1.	
4. Modeling performance & uncertainty of EDRP and SCRs	Work with GE to test various methods of modeling.		Expands section 3.5.2	
5. Modeling of UDRs	Coordinate UDR modeling with other Areas.		Expands section 3.5.2	
6. NYISO Staff manpower and computer run time	Evaluate NYISO staff manpower requirements and ways to reduce computer run time.		Include with item 2.	
7. Improve modeling of intermittent resources.	Separate types of hydro units. Work with GE to test various methods of modeling these and wind power.		Expands section 3.5.2	
8. Free flow Equivalent IRM	Better define free flow IRM point on Unified Method curves.		Include with item 2.	
9. Confirming transfer limits	Work with ISO to ensure data is available when required.		Is in section 3.5.4.	
10. Data Base Accuracy	Develop process to ensure data base accuracy.		Add new section in 3.5.	

NYSRC – ICS

2006 IRM Study Lessons Learned (Roadmap for 2007)

May 1, 2006 – **Draft 5**

1. Locking Timeframe and Project Scope

Concerns:

- As seen with the December UDR (Unforced Deliverability Rights) elections, last-minute changes in the IRM (Installed Reserve Margin) Study process imposed a great burden upon the NYSRC and NYISO. Both organizations struggled to complete the IRM Study in a timely manner as the IRM is prerequisite for capacity procurement during the summer capability period.
- This becomes critical as the IRM must first be approved by the NYSRC Executive Committee (EC) and any change to the IRM must be filed with FERC for approval. Further subsequent analysis of locational requirements and approval by the NYISO Operating Committee (OC), is required.
- Because of schedule slippage, it became impossible to fully update the 2006 IRM Study to reflect all modeling and assumptions changes.

Actions / Resolution:

- Review the timeline in Policy 5 and make appropriate changes.
- The NYSRC and NYISO should be encouraged to adhere to strict deadline to "lock down" modeling and assumptions for the IRM Base Case.
- If both the NYSRC and NYISO agree upon such date (presently August 1st, according to Policy 5), then it is imperative to inform all stakeholders of the requirement and possible consequences if late-breaking study revisions are forced upon the NYSRC and NYISO.

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2. Sensitivity Case Procedure and Explanation of Results

Concerns:

- The procedure for performing the sensitivity cases was changed late in the process. The revised procedure did provide reasonable results; however, the method used to run the sensitivity cases should be reviewed.
- With the adoption of the unified methodology, time considerations for sensitivity runs, and increasing number of zones modeled, there is a need to improve the run time of the MARS program. Furthermore, sensitivity analysis provides an excellent mechanism for illustrating the "cause and effect" of how certain performance and/or operating parameters can impact reliability. However, the report text included little (if any) explanation of how or why the IRM Base Case numbers changed. This explanation is very important for enhancing the overall education process for participants and stakeholders. [MOVED FROM SECTION 6.]

[THE ABOVE INFORMATION WAS MOVED TO ISSUE #6]

Actions / Resolution:

- The procedure for performing the sensitivity cases needs to be reviewed to determine if there is a better method. Although the best method is re-do the entire LCR-IRM curve for each sensitivity, this is not practical. Improving model runs times, however, may allow for more complete sensitivity results.

- This review should consider determination of the impact of the sensitivities (or at least some of the sensitivities). For example, it may be more relevant to simply make the sensitivity change to the base case and observe the LOLE change in NYCA and specific zones (as opposed to recalibrating the result to 0.100 LOLE).
- The ICS needs to embellish explanation of sensitivity cases to better illustrate "cause and effect".
- It may be appropriate to classify some sensitivities on a zonal or super-zonal basis. This concept will also be reviewed in the context of the Upstate/Downstate study. [MUCH OF THE ABOVE INFORMATION WAS MOVED FROM ISSUE #6]
- A paper should be prepared recommending actions on the above issues regarding sensitivity case procedures and analysis.

[THE ABOVE INFORMATION WAS MOVED TO ISSUE #6]

3. Defining "TAN 45 Anchor Point"

Concerns:

- The "TAN 45 Anchoring Method" was developed by the ICS as a method to identify the "knee" (where the curve bends) of the IRM-LCR curves using a tangent of 45° line to "mark" the Base Case. During recent ICS meetings, several participants raised concerns over the application of the "TAN 45 Anchor" method.
- Recent comments have indicated that setting the TAN 45 point is based on engineering judgment and suggested the TAN 45 point needs to be mathematically derived using the equation of the best fit curve of the IRM and LCR pair points.
- As the 2006 IRM Study period reached conclusion, several participants offered various mathematical solutions on the Tan 45 issue including regression analysis and scaling to use MW values instead of percentages.
- During 2005, the EC approved the use of the TAN 45 Anchor method for one year only — with the provision that the method will be reevaluated. It is recommended for the ICS to continue exploring this issue and reach consensus on the continuation and implementation of the TAN 45 Anchor method.

Actions / Resolution

- The final TAN 45 Method should be fully discussed in the appendices section of the IRM report.
- The ICS should prepare a white paper critiquing the performance of the TAN 45 methodology used in the 2006 IRM Study, including the relationship between the physical meaning of the TAN 45 compared to the mathematical meaning. As appropriate, the paper should recommend a mathematically derived or other method for identifying the TAN 45 point.
- To respond to the 4th "Concern" bullet a separate white paper should be prepared comparing the pros and cons of the TAN 45 Method vs. the Free Flow Equivalent Method.

4. Factoring Performance and Uncertainty of EDRP and SCRs

Concerns:

- During 2005, actual performance of SCRs (Special Case Resources) in several Zones was far less than was expected or projected for the IRM Study.
- Of great concern to the ICS and statewide reliability was the lackluster performance of the downstate SCRs on 27-Jul 2005 given the relative importance of those locational resources.

- Recent SCR program rules changes include the development of seasonal versus 12-month performance factors and revising APMD (Average Peak Monthly Demand) calculations to be based on the hours from noon to 8 pm. All such measures are designed to tighten SCR performance standards. In addition, stakeholders proposed the creation of a 30-minute Demand Response (SCR-like) program in addition to the current 4-hour SCR program.
- The SCR/EDRP sensitivity case attributed a suspiciously large impact on the IRM to these resources as a result of the way sensitivity cases were run. (See Issue # 2).
- Modeling the SCR and EDRP resources using a 100% availability derated resource may not provide an accurate representation of the contribution to reliability

Actions / Resolution:

- The ICS should reassess the current method used to factor in the expected performance of SCRs and the EDRP in the IRM base case. ICS should work with GE if appropriate.
- This reassessment should include consideration of changing derates applied to the SCRs and the EDRP, or basing the expected performance of SCRs and EDRP on a multi-year history, such as 5 years as in the case of generator performances.
- The reassessment should also look at applying a probabilistic representation of the SCR and EDRP response rather than using a derated capacity representation.
- The ICS could also establish additional sensitivity studies to more accurately quantify the importance and magnitude of such programs as pertains to statewide reliability.
- A paper should be prepared discussing solutions from the above actions.
- The revised MARS database appears to have mitigated from the original large impact on IRM.

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5. Modeling UDRs

Concerns:

- The Cross Sound Cable (CSC) was modeled as UDRs (Unforced Deliverability Rights) because of LIPA's UDR election based on its contract for 345 MW of capacity from the 600 MW Bear Swamp hydroelectric pumped storage facility in Massachusetts.
- Modeling the CSC as UDRs (instead of being available fully for emergency assistance) created significant impact to the 2006 IRM Study — a change that resulted in a 0.5% increase in the 2006 IRM Base Case, from 17.5% to 18.0%. This change created a result that had to be further analyzed and explained within the report.
- Another concern is that the need for coordination with the neighboring control area on the modeling of the UDRs – this will become more important with the potential of also having to model the Neptune Cable as UDRs in the upcoming 2007 IRM Study.

Actions / Resolution:

- The ICS and NYISO should coordinate the modeling of the CSC with ISO-NE as part of the Joint NYSRC/NYISO/ISO-NE Tie Benefit Analysis.
- The ICS and NYISO should also coordinate with PJM the modeling of the Neptune Cable.
- The ICS should reaffirm the UDR model to be utilized for the 2007 IRM Study.

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6. NYISO Staff Resource and Computer Run Time Issues

Concerns:

- With the adoption of the unified methodology, time considerations for sensitivity runs, and increasing number of zones modeled, there is a need to improve the run time of the MARS program.
- The NYISO staff's time and personnel resources for preparing the GE-MARS modeling and IRM evaluations were stretched to the breaking point during the 2006 IRM Study.
- Due to the number of projects on the ICS / NYISO docket, there are major concerns about the NYISO's capability of completing these studies. Besides the 2007 IRM Study, there are the "Upstate-Downstate Superzone Study" and the "New York – New England Tie Benefits Study" — just to name two of the larger studies.

[THE ABOVE INFORMATION WAS MOVED TO ISSUE #2]

Actions / Resolution:

- The NYSRC needs to appeal to the NYISO for much-needed personnel and modeling assistance, as the IRM modeling represents a major annual effort. The importance of this work needs to be fully recognized — and appropriately staffed and funded by NYISO management.
- The ICS should examine methods for improving run time such as running the model during months that exhibit risk, clustering computers, and automation techniques (including the feasibility of using the Con Ed front end program).
- A paper should be prepared recommending actions on the above issues regarding NYISO staff resources and improving computer run time.

[THE ABOVE INFORMATION WAS MOVED TO ISSUE #2]

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7. Modeling the Uncertainty of Intermittent Resources

Concerns:

- Intermittent resources such as hydro should be more fully explored with regard to IRM modeling.

Actions / Resolution:

- The ICS should evaluate the feasibility of separating hydro resources that have storage capability from those that don't in order to determine if a better modeling approach could be realized for these resources. The ICS and NYISO staff should work with GE as appropriate. A paper should be prepared providing the results of this evaluation.

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8. Determining the Free-Flowing Equivalent IRM

Concerns:

- Due to time and resource restrictions, insufficient evaluation was conducted in determining the free-flowing equivalent IRM with associated LCR levels for Zone J and K.
- During 2005, National Grid (NGrid) filed a complaint with FERC arguing that the current methodology should be replaced with a free-flowing equivalent IRM construct.

Actions / Resolution:

- The NYSRC Executive Committee (EC) approved a work scope for the ICS' proposed "Upstate-Downstate Superzone Study". The ICS is encouraged to proceed with this evaluation.
- With respect to evaluating the IRM/LCR curves, using MW value scaling may better help define the "left side" of the curves where the system approaches the free-flowing equivalent IRM value.
- Also, in response to the NGrid IRM complaint filed at FERC, a joint ICS-ICAPWG group — the Resource Adequacy Issues Task Force (RAITF) has been formed to address NGrid's concerns. ICS members are encouraged to participate in this activity.
- Refer to the third Action bullet under Issue #3, "Defining TAN 45 Point"

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9. Confirming Interface Transfer Limits

Concerns:

- In meetings leading up to finalization of the 2006 IRM Study, a number of questions were raised regarding the consistency of thermal and voltage limits at interfaces when compared to the NYISO's Reliability Needs Assessment (RNA) report.

Actions / Resolution:

- The NYISO should reevaluate all interface transfer limits and make necessary changes on the NYS Transmission System Representation map in accordance with time line developed under Issue # 1.

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10. Database Accuracy

Concerns:

- A database error was found late in the IRM_LCR process. Is the database undergoing sufficient review to ensure that errors can be found and corrected in a timely manner.

Actions / Resolution:

- The ICS should create a task force to examine this issue and make appropriate recommendations in a white paper.
- The possibility of providing the NYISO database to ICS (subject of course to additional confidentiality protection) should be explored by NYISO.
- A separate and independent entity, such as GE, should review the database.
- Review the need for additional NYISO staff resources as discussed under item 6 (above)
- A paper should be prepared recommending the above findings.