Attachment J:
Unforced Capacity for Installed Capacity Suppliers

1.0 Fundamental Formulae

(1-1) $UCAP = (1 - EFOR_D) \times DMNC$

(1-2) $EFOR_D = \dfrac{f_f \times FOH + f_p \times (EFOH - FOH)}{SH + f_f \times FOH}$

(1-3) $f_f = \dfrac{\frac{1}{r} + \frac{1}{T}}{\frac{1}{r} + \frac{1}{T} + \frac{1}{D}}$

(1-3a) r = average forced outage duration $= \dfrac{FOH}{\text{number of forced outages}}$

(1-3b) T = average time between calls for a unit to run $= \dfrac{RSH}{\text{number of attempted starts}}$

(1-3c) D = average run time $= \dfrac{SH}{\text{number of successful starts}}$

(1-4) $f_p = \dfrac{SH}{AH}$

~~(1-5) Divide by 0 logic:~~
~~If RSH = 0 (<1), set ff = 1;~~
~~If SH = 0, set ff = 1;~~
~~If FOH = 0, set 1/r = 0 and calculate ff per its equation; and~~
~~If AH = 0, set fp =1.~~

Note: UCAP values will be calculated monthly for each Resource based on a rolling 12-month calculation. The detailed formulae, including treatment where new units are being phased in, are shown in Section 3.

2.0 Definitions

UCAP.....Unforced Capacity

$EFOR_D$ ..... Equivalent Demand Forced Outage Rate

DMNC..... per Tariff definition

~~ICAPeq~~ ICE ..... Installed Capacity Equivalent as defined in the Services Tariff and in Section 3 of this Attachment J.

Net Dependable Capacity .... The gross power level that a unit can sustain during any period of time when there are no equipment, operating or regulatory restrictions and after adjusting for station service and auxiliary loads and ambient conditions. Average ambient temperature should reflect the average of the daily high temperatures for the month at the plant location. Only one Net Dependable Capacity for each Resource shall be reported for each month. That value may be either the Resource's DMNC for the Capability Period containing that month or that Resource's average Net Dependable Capacity for that month, at the discretion of the owner of the Resource.

f_f ..... full f-factor (see formula in Section 1.0)

f_p ..... partial f-factor (see formula in Section 1.0)

FOH..... Full Forced Outage Hours

Forced Outage..... An unplanned failure that requires a unit to be removed from service, or the Load on the unit to be reduced before the end of the nearest following Weekend.

EFOH ..... Equivalent Full Forced Outage Hours: Sum of all hours a unit was involved in an outage expressed as equivalent hours of full forced outage at its maximum net dependable capability.

SH ..... Service Hours: The time a unit is electrically connected to the system - Sum of all Unit Service Hours.

AH..... Available Hours: The time a unit is capable of producing energy, regardless of its capacity level -- Sum of all Service Hours + Reserve Shutdown Hours + Pumping Hours + Synchronous Condensing Hours.

RSH..... Reserve Shutdown Hours: The time a unit is available for service but not dispatched due to economic or other reasons.

PH .....Period hours equals 24 times the number of days in the reporting period.

Note: For in-depth GADS Data concepts, refer to the NERC Fast Link for GADS Services at www.nerc.com.

3.0 Calculations

In general, all generating Resources with nameplate capacities greater than 10 MWs or plants with aggregated capacities greater than 25 MW are expected to provide the full GADS Data set defined in Attachment K. Units for which the full GADS Data set is provided will have their UCAP based on $EFOR_D$ according to Section 3.1 below. All other generating units will be rated based on equivalent GADS Data as described in Section 3.2. Energy Limited Resources that do not want to have their UCAP based on production levels using equivalent GADS Data will have to submit GADS Data to document their available capacity for the minimum 4-hour daily requirement period. Special Case Resources will have their UCAP based on Load reduction determined in Section 3.3.

3.1 UCAP based on $EFOR_D$

(a) Determining the Amount of UCAP a Supplier Qualifies to Supply

$UCAP^{Q}_{gm}$ ~~$UCAP_{gm}$~~ = $(1\text{-}EFOR_{Dgm})\ DMNC_{gm}$

~~; and~~ where:

~~ICAPeq = UCAPgmp/(1-EFORDgm)~~

~~where:~~

~~UCAPgm is the~~ $UCAP^{Q}_{gm}$ is the amount of Unforced Capacity that supplier *g* is qualified to provide in month *m*;

~~*UCAPgmp is the Unforced Capacity that supplier g provides in month m;*~~ $EFOR_{Dgm}$ is the Equivalent Demand Forced Outage Rate calculated for supplier *g* that will be used to determine the amount of Unforced Capacity that the Resource will be permitted to provide in month *m*, as defined further below; and

$DMNC_{gm}$ is the DMNC rating for supplier *g* which is applicable for month *m*, which shall be the most recent Summer DMNC rating for that supplier calculated in accordance with ISO procedures if month *m* is part of a Summer Capability Period, or the most recent Winter DMNC rating for the supplier calculated in accordance with ISO procedures if month *m* is part of a Winter Capability Period, as of the close of business on the last business day preceding the Monthly

Installed Capacity Auction that is conducted during the month preceding month *m*.

A rolling, cumulative, 12-month $EFOR_D$ will be calculated for each Resource that submits GADS Data using the GADS reporting format in Attachment K. The $EFOR_D$ for month (m) will be based on GADS Date for months, m-14, through and including month, m-3. (For example, $EFOR_D$ for August will be based on data submitted for June of the prior year through May of the current ~~year).~~ year.)

$$EFOR_{Dgm} = \frac{IST_{ge}}{12} \times \frac{f_{fgbe}FOH_{gbe} + f_{pgbe}(EFOH_{gbe} - FOH_{gbe})}{(SH_{gbe} + f_{fgbe}FOH_{gbe})} + \left(1 - \frac{IST_{ge}}{12}\right)CEFOR_{Dg}$$

where f_{fgbe} and f_{pgbe} are further defined below and:

$EFOR_{Dgm}$ as above, is the Equivalent Demand Forced Outage Rate calculated for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*;

IST_{ge} is the number of months that Resource *g* had been in service as of time *e* (0 if generator *g* was not in service as of time *e*; 12 if Resource *g* was in service from months *m*-14 through month *m*-3);

FOH_{gbe} is the sum of all Full Forced Outage Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e*. The data ~~is~~ are the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 40-43 and Event Record 01, NERC Event Types U1, U2, U3, and SF;

$EFOH_{gbe}$ is the sum of all Equivalent Full Forced Outage Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e*. The data ~~is~~ are the GADS Data submitted in accordance with Attachment K for NERC Event Types U1, U2, U3, D1, D2, D3 and SF, such that:

$$EFOH_{gbe} = \sum_{all\ i} \frac{(NDC_{gi} - NAC_{gi})H_{gi}}{NDC_{gi}}$$

~~, and~~ where:

~~where:~~ OUT_{gbe} is the set of outages for Resource *g* during the period beginning at time *b* and ending at time *e*;

NDC_{gi} is the Net Dependable Capacity for Resource *g* applicable for outage *i*, submitted in accordance with Attachment F, Performance Record 01, columns 35-38;

NAC_{gi} is the Net Available Capacity for Resource *g*, applicable for outage *i*, submitted in accordance with Attachment K, Event Record 01, columns 60-63; and

H_{gi} is the time accumulated for Resource *g* applicable for outage *i* submitted in accordance with Attachment K, columns 20-27 and columns 48-55, (*i.e.*, the positive difference between the start and end of the event);

SH_{gbe} is the sum of all Service Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 16-19;

e is the end of the month occurring three months before month *m*, (e.g., if month *m* is September 2001, then *e* is the end of June 2001);

b is the beginning of the month occurring 14 months before month *m*, unless the supplier had not gone into service at that time, in which case *b* is the time at which that supplier went into service; and

$CEFOR_{Dg}$ is the class-equivalent $EFOR_D$ calculated by the ISO for suppliers of the same class as supplier *g* based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment, if a mutually acceptable value cannot be agreed on.

Then:

$$f_f = \left| \frac{\frac{1}{r} + \frac{1}{T}}{\frac{1}{r} + \frac{1}{T} + \frac{1}{D}} \right|$$

where:

r is FOH_{gbe} divided by the total number of GADS Data Forced Outages reported for the period beginning at time *b* and ending at time *e* in accordance with Attachment K;

T is the number of Reserve Shutdown Hours (RSH_{gbe}) divided by the number of attempted starts reported for the period beginning at time *b* and ending at time *e* for Resource *g*. RSH_{gbe} is the sum of all Reserve Shutdown Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 20-23; and

D is the number of Service Hours (SH_{gbe}) divided by the number of successful starts reported for the period beginning at time b and ending at time *e* for Resource *g*; and

$$f_{pgbe} = \frac{SH_{gbe}}{AH_{gbe}}$$

where:

AH_{gbe} is the sum of all Available Hours reported for Resource *g* for the period beginning at time *b* and ending at time *e* in accordance with GADS Data submitted under Attachment K, Performance Record 02, Columns 32-35.

These equations shall be modified when necessary as follows in order to avoid dividing by zero:

If RSH = 0 (<1), set $f_f = 1$;

If SH = 0, set $f_f = 1$;

If FOH = 0, set 1/r = 0 and calculate f_f per its equation; and

If AH = 0, set $f_p = 1$.

(b) Determining the ICE of the Amount of UCAP Supplied

$ICE_{gm} = UCAP^{P}_{gm} / (1 - EFOR_{Dgm})$

where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that supplier *g* supplies in month *m*;

$UCAP^{P}_{gm}$ is the amount of Unforced Capacity that supplier *g* supplies in month *m*; and

$EFOR_{Dgm}$ as above, is the Equivalent Demand Forced Outage Rate calculated for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*.

3.2 UCAP based on equivalent GADS Data (capacity factor method)

~~; and~~**(a) Determining the Amount of UCAP a Supplier Qualifies to Supply**

$$UCAP_{gm} = (1 - OF_{gm}) DMNC_{gm}$$ ~~where:~~;

~~UCAPgm~~ where:

$\underline{UCAP^{Q}_{gm}}$ is the Unforced Capacity that supplier *g* is qualified to provide in month *m*;

~~*UCAPgmp is the Unforced Capacity that supplier g provides in month m;*~~OF_{gm} is the Outage Factor calculated for supplier *g*, as further defined below, that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*; and

$DMNC_{gm}$ is the DMNC rating for supplier *g* which is applicable for month *m*, which shall be the most recent Summer DMNC rating for that supplier calculated in accordance with ISO procedures if month *m* is part of a Summer Capability Period, or the most recent Winter DMNC rating for the supplier calculated in accordance with ISO procedures if month *m* is part of a Winter Capability Period, as of the close of business on the last business day preceding the Monthly Installed Capacity Auction that is conducted during the month preceding month *m*.

A rolling, cumulative 12-month, outage factor (OF) will be calculated for each Resource that submits the basic data (equivalent GADS Data) using the GADS Data form in Attachment K. The OF for month (m) will be based on GADS Data for months, m-14 through month m-3. (For example, $EFOR_D$ for August will be based on data submitted for June of the prior year through May of the current year).

$$OF_{gm} = \frac{IST_{ge}}{12} \times \left(1 - CF_{gbe}\right) + \left(1 - \frac{IST_{ge}}{12}\right)\left(1 - CCF_{g}\right)$$

where:

OF_{gm} is the Outage Factor for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*;

IST_{ge} is the number of months that Resource *g* had been in service as of time *e* (0 if generator *g* was not in service as of time *e*; 12 if Resource *g* was in service from months m-14 through month m-3); and

$$CF_{gbe} = 1 - \frac{\left(NAG_{gbe}\right)}{\sum_{m=B}^{E}\left(NDC_{gm}\left(PH_{gm} - POH_{gm} - MOH_{gm}\right)\right)}$$

where:

CF_{gbe} is the Capacity Factor for Resource *g* for the period beginning at time *b* and ending at time *e*;

NAG_{gbe} is the Net Actual Generation for Resource *g* for the period beginning at time *b* and ending at time *e*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 39-45;

NDC_{gm} is the Net Dependable Capacity for Resource *g* for month *m*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 01, columns 35-38;

PH_{gm} is the Period Hours reported for Resource *g* for month *m*. The data is the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 56-59;

POH_{gm} is the Planned Outage Hours reported for Resource *g* for month *m*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 36-39;

MOH_{gm} is the Maintenance Outage Hours reported for Resource *g* for month *m*. The data is from the GADS Data submitted in accordance with Attachment K, Performance Record 02, columns 44-47;

CCF_g is the class-equivalent Capacity Factor for suppliers of the same class as supplier *g* based on NERC class averages for similar Resources. Where no similar Resource exists, the NYISO will estimate a value based on its best judgment if a mutually acceptable value cannot be agreed on;

b is the beginning of the month occurring 14 months before month *m*, unless the supplier had not gone into service at that time, in which case *b* is the time at which that supplier went into service;

e is the end of the month occurring three months before month *m*, (e.g., if month *m* is September 2001, then *e* is the end of June 2001);

B is the month containing time *b*; and

E is the month containing time *e*.

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICAP_{eq} = UCAP_{gmp} / (1 - OF_{gm})$$

where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that supplier *g* supplies in month *m*;

$UCAP^{P}_{gm}$ is the amount of Unforced Capacity that supplier *g* supplies in month *m*; and

OF_{gm}, as above, is the Outage Factor for Resource *g* that will be used to determine the amount of Unforced Capacity that Resource will be permitted to provide in month *m*.

3.3 UCAP based on Load/Demand Reduction applicable to Special Case Resources

;(a) Determining the Amount of UCAP a Supplier Qualifies to Supply

$$UCAP_{gm} = \left(APMD_{gm} - CMD_{gm}\right) \times \frac{\sum_{h \in LRH_{gbe}} \min\left(\frac{APMD_{gh} - AMD_{gh}}{APMD_{gh} - CMD_{gh}}, 1\right)}{NLRH_{gbe}}$$ Where:;

UCAPgm where:

$UCAP^{Q}_{gm}$ is the Unforced Capacity that Resource *g* is permitted qualified to provide in month *m*;

$APMD_{gm}$ is the Average of Peak Monthly Demands for Resource *g* applicable to month *m*, using data submitted in accordance with Attachment K, Special Case Resource Certification; if month *m* is in the Summer Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the most recent months of June, July, August and September that had occurred as of the end of month *m*; and if month *m* is in the Winter Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the most recent months of November, December, January and, February and March that had occurred as of the end of month *m*;

CMD_{gm} is the Contract Minimum Demand for resource *g* applicable to month *m*, using data submitted in accordance with Attachment K, Special Case Resource Certification;

LRH_{gbe} is the set of hours in the period beginning at time *b* and ending at time *e* in which Resource *g* was requested to reduce load;

$APMD_{gh}$ is the applicable Average of Peak Monthly Demands for Resource *g* applicable to hour *h*, using data submitted in accordance with Attachment K, Special Case Resource Certification; if hour *h* is in the Summer Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the most recent months of June, July, August and September that had occurred as of time *e*; and if hour *h* is in the Winter Capability Period, the Average of Peak Monthly Demands is calculated using the peak monthly demands for that supplier for the most recent months of November, December, January and, February and March that had occurred as of time *e*;

AMD_{gh} is the Average Minimum Demand for Resource *g* for hour *h*, using data submitted in accordance with Attachment K, Figure 2, Special Case Resource Minimum Load Demonstration;

CMD_{gh} is the ~~applicable~~ Contract Minimum Demand for Resource *g* applicable to hour *h*, using data submitted in accordance with Attachment K, Special Case Resource Certification;

$NLRH_{gbe}$ is the number of hours during the period beginning at time *b* and ending at time *e* in which Resource *g* was requested to reduce load;

b is the beginning of the month occurring 14 months before month *m*, unless the supplier had not begun at that time to serve as a Special Case Resource available to reduce load, in which case *b* is the time at which that supplier began to serve as a Special Case Resource available to reduce load; and

e is the end of the month occurring three months before month *m* (e.g., if month *m* is September 2001, then *e* is the end of June 2001).

(b) Determining the ICE of the Amount of UCAP Supplied

$$ICAP_{eq} = (APMD_{gm} - CMD_{gm}) \blacksquare$$

where:

ICE_{gm} is the Installed Capacity Equivalent of the amount of Unforced Capacity that supplier *g* supplies in month *m*;

$APMD_{gm}$ is the Average of Peak Monthly Demands for Resource *g* applicable to month *m*, using data submitted in accordance with Attachment K, Special Case Resource Certification, as calculated above; and

CMD_{gm} is the Contract Minimum Demand for resource *g* applicable to month *m*, using data submitted in accordance with Attachment K, Special Case Resource Certification.

3.4 Calculation of UCAP for Winter-Peaking Control Area System Resources

The ISO ~~shall~~ will perform the following calculations at the beginning of each Capability Period to determine the amount of Unforced Capacity that a Control Area System Resource or the purchasers of Unforced Capacity from a Control Area System Resource may supply to the NYCA ~~in the following manner. All calculations will~~, if that Control Area experiences peak demand during the winter. These calculations shall be ~~made~~ based on the forecasted CARL Data reported ~~by the Control Area System Resource~~ pursuant to Section 4.4.3 of this Manual.

(a) Determining the Amount of UCAP a Supplier Qualifies to Supply

For the Summer Capability Period as well as for the individual months of November and April within the Winter Capability Period, the amount of UCAP such ~~For the eight month period from April through November, the amount of Unforced Capacity available from~~ a Control Area System Resource is qualified to supply ($UCAP^Q$) shall not exceed~~,~~ for all months, or any month, ~~the single lowest~~ of that Period the minimum monthly value ~~in that eight month period,~~ derived ~~by using~~ from the following formula:

$$\text{~~UCAP~~ } UCAP^Q = (CAP + EP - MPL - EF - PM - FO - OR) \bullet (1 - CAF)$$

For the months of December to March, which shall be treated as a whole for the purpose ~~If the amount~~ of Unforced Capacity ~~that is available from~~ calculations, this amount shall not exceed for all months, the value derived from the following formula:

$$UCAP^Q = (CAP + EP - WPL - EF - PR - PM) \bullet (1 - AFO) \bullet (1 - CAF)$$

With the exception of $UCAP^Q$ and CAF, all acronyms used in this section 3.4 of this Attachment are defined in section 4.4.3 of this Manual. CAF is the Curtailment Adjustment Factor, reflecting any de-rating in the amount of capacity provided by such a Control Area System Resource~~, using the above formula, is less than~~ if that Control Area will curtail NYCA load with the same priority with which it curtails its own native load. (See Services Tariff Sec. 5.12.2.)

(b) Determining the ICE of the Amount of UCAP Supplied

The Installed Capacity Equivalent of the amount of Unforced Capacity that ~~was committed, a deficiency charge will be assessed to the supplier for applicable current and previous months in the April through November period. The supplier will have an opportunity to mitigate future deficiencies by entering into bilateral transactions or NYISO administered auctions.~~

~~A separate calculation of the available Unforced Capacity from~~ a Control Area System Resource ~~will be made for the months of December through March using the formula below. The product of the formula will equal~~ supplies in any given month shall be calculated by dividing the amount of Unforced Capacity ~~available from a~~ supplied by that Control Area System Resource by the quantity one minus the Curtailment Adjustment Factor applied to Unforced Capacity sales from ~~in each of the four months.~~

~~UCAP = (CAP + EP - WPL - EF - PR - PM) x (1 - AFO)~~

~~If the amount of Unforced Capacity~~ that ~~is available from a~~ Control Area System Resource~~, using the above formula, is less than the amount of Unforced Capacity that was committed, a deficiency charge will be assessed to the supplier for~~

~~applicable current and previous months in the December through March period~~. ~~The supplier will have an opportunity to mitigate future deficiencies by entering into bilateral transactions or NYISO administered auctions.~~

~~(All acronyms used in this section 3.4 of this Attachment, are defined in section 4.4.3 of this Manual.)~~