ATTACHMENT A

Lake Erie Emergency Re-dispatch Agreement

June 2000
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Lake Erie Emergency Re-dispatch (LEER) Agreement

Objective

The objective of the Lake Erie Emergency Re-dispatch (LEER) procedure is to facilitate emergency re-dispatch among participating control areas surrounding Lake Erie (AEP, AP, FE, MECS, NYISO, IMO, and PJM) to avoid the shedding of firm load. The LEER procedure is only intended to be implemented for emergency re-dispatch to relieve transmission constraints that could otherwise require another Lake Erie Company to shed firm load. The LEER procedure would only be fully executed when firm load curtailment is imminent. Lake Erie Control Areas must purchase emergency power from unconstrained directions or from other sources, if possible, before calling on the Lake Erie Emergency Re-dispatch procedure.

Attempts should be made by the Dependent System or Purchasing-Selling Entities operating in these areas, where applicable, to secure firm transmission services to support transactions that are required to supply firm load.

Lake Erie Security Coordinators (SCs) and Control Areas (CAs) will provide emergency aid in the form of intra-Control Area re-dispatch, inter-Control Area re-dispatch, re-configuration of the transmission system, and/or adjustment of phase angle regulating transformers to maintain Firm Load service when possible. Phase Angle Regulator adjustments are not limited to only those PARs under the control of the constrained system. SCs/CAs will determine emergency re-dispatch options and requirements prior to actions being needed.

Provisions of the LEER procedure are not intended to conflict with applicable transmission service agreements, tariffs filed with Federal and State regulatory commissions, NERC Policies, or any Federal (Canada) or Provincial regulatory requirements. The terms of such agreements, tariffs, policies, and requirements take precedence over LEER.

Under the Lake Erie Emergency Re-dispatch Process, transactions with non-firm or firm transmission reservations which would otherwise be curtailed in accordance with NERC Policy 9, resulting in the shedding of firm load, may be protected from curtailment through the implementation of re-dispatch actions. Once implemented, if a controlling action and any applicable transmission service for it are curtailed by NERC Transmission Loading Relief (TLR) actions, the protected transaction will also be curtailed. In this case, either the protected transaction is removed from the group of transactions appropriate for TLR by the controlling transaction’s effective nullification of the protected transaction (effectively curtailing the transaction), or the controlling transaction itself is curtailed and the protected transaction is curtailed with it. In neither case is a protected transaction whose service priority was non-firm given higher priority than a transaction whose service priority was firm.

LEER is intended to make protection available for any transaction that serves firm load and is at risk of curtailment under NERC’s TLR procedure, regardless of whether that transaction’s transmission service priority is firm or non-firm. The choice of requesting that a particular transaction be protected under LEER depends on whether the load served is firm, and is a security decision of the Dependent Control Area. LEER is simply intended to provide an option
to avoid the curtailment of firm load resulting from TLR actions. The use of non-firm transmission to serve firm load is not condoned. The Dependent Systems or Purchasing-Selling Entities operating in these areas should attempt, where applicable, to secure firm transmission services to support transactions that are required to supply firm load.

The Constrained System's SC/CA should notify all other LEER participants of any pending constraints and potential impacts such that implementation of the LEER procedure may be considered. The LEER procedure will be initiated by the Dependent System's SC/CA, but must be directed by the Constrained System's SC/CA. The relevant parameters for all transactions covered by LEER should be supplied to the IDC database and the IDC software or equivalent should be the primary tool used to identify scheduled transactions that are subject to curtailment. This procedure is intended to be as dynamic as practicable, allowing the dependent and constrained system's SC/CA to update dependent transactions and controlling actions as system conditions change.

**Preliminary Actions**

Prior to implementing LEER, all Phase Angle Regulator adjustments and other “no cost” operating procedures should be utilized by Lake Erie participants to the benefit of reliability of the bulk power system. However, owners of PARs, etc., are not expected to incur excessive financial harm by operating PARs at a tap position that forces uneconomical operation.

Re-dispatch service shall be available to any participants within the Lake Erie Control Areas relying on interconnection transactions to meet firm load. Prior to resorting to re-dispatch service, the Dependent System shall curtail interruptible customers and reduce voltage, if applicable and as system conditions permit, and use their best efforts to obtain other sources of energy that do not adversely affect the Constrained System(s). Highly effective generation shifts, including generation under the control of Independent Power Producers and Power Marketers, should be used for re-dispatch, if applicable.

**Coordinating Actions**

SCs/CAs who determine at any time that they are dependent on purchases and may need to implement the LEER procedure shall provide, via the Security Coordinator Information System (SCIS), its expected peak dependence on covered transactions.

\[
\text{Dependency} = \text{Forecasted/Actual Load} - \text{Committed/Available Resources} - \text{MW Voltage Reduction} - \text{MW Interruptible/Curtailable Load}
\]

The Lake Erie SCs/CAs implementing LEER shall identify those dependent transactions in the IDC that require re-dispatch service. This list of dependent transactions should be published via the SCIS “System Emergency” messaging page for participating SC/CAs to investigate possible mitigating measures including re-dispatch.

The SCs/CAs initiating the LEER procedure shall conduct a conference call to discuss their dependency on external transactions. At this time each Lake Erie SC/CA shall discuss expected
constraints on their system and how those constraints would impact the SCs/CAs with the dependency. The Constrained System's SC/CA and Dependent System's SC/CA should discuss the optimal re-dispatch solution for the expected constraint, taking into consideration generation available for re-dispatch (both reduction (DEC) and increase (INC) in generation). The Dependent SC/CA should determine the appropriate GSF/PTDF/OTDF for use in the re-dispatch evaluation, using on-line or off-line load flows that depict current system topology. The Constrained System's SC/CA, the one declaring TLR, must be in control of the re-dispatch process and agree with the effectiveness of all schedule/re-dispatch changes. This process may involve other SCs/CAs who are in control of and have available the generation designated for re-dispatch.

LEER re-dispatch can be implemented as follows, to the extent that generation is available and transmission tariffs allow:

1. Lower Controlling Generator (s) DEC Unit (s): The Dependent System's SCs/CAs or Purchasing-Selling Entities (PSEs) operating in these areas, where applicable, would arrange to replace the amount of generation that was lowered by the controlling generator with an Emergency Transaction.

2. Raise Controlling Generator (s) INC Unit (s): The Dependent System's SCs/CAs or PSEs operating in these areas, where applicable, would arrange to purchase the most effective generator increase, where available, as an Emergency Transaction.

3. A combination of the above two options may be exercised to effect the re-dispatch option.

These actions will allow for continued transfers across the constrained flowgate, minimizing the need to curtail scheduled transactions supplying firm load. The generation shift factors (GSFs) for use in the re-dispatch evaluation must be based on a current system analysis, which depicts the latest system topology. Re-dispatch should be at the request of the SCs/CAs (or on behalf of PSEs in their control area where applicable) with the dependency, but under the direction of the constrained SCs/CAs.

All SCs/CAs should expedite the emergency re-dispatch schedule without regard for the formality of obtaining transmission service reservations on OASIS, and permit after-the-fact reservations, where required. Transmission reservations are secured on OASIS and the protecting counter-flow transactions are E-tagged and entered in the IDC according to NERC policies. Reservations for LEER counter-flow transactions may be entered in the OASIS after the fact, but not exceeding a delay greater than four hours. The objective is to provide information on OASIS as soon as practicable.

The Lake Erie participants have agreed that transmission reservations for LEER emergency purchases would be reserved as non-firm hourly (Level 2 priority). All parties to a LEER transaction are responsible for entering the appropriate transmission reservations pertaining to their portion of the transaction into their OASIS nodes and the Load Control Area (area with the DEC Unit) for creating the appropriate NERC tag (s) needed to support the LEER counter-flow transaction. Since the protected transaction and the controlling transaction require each other to remove their contribution to the constraint, it is necessary to curtail both if either is curtailed.
Transactions for which re-dispatch is implemented shall be protected from further curtailment on the designated **flowgate**. A single LEER transaction may be used to protect multiple transactions flowing in the same direction (Block Protection). Series **flowgates** may be protected by a single LEER transaction. Once re-dispatch begins to protect **dependent transactions**, they are categorized as **protected transactions**. Any additional loading of the **flowgate** should not be associated with the **protected transactions** so long as the re-dispatch action is current. Re-dispatch can be applied to a whole or part of a transaction, as required by the magnitude of the **dependency**. When the re-dispatch action covers only a portion of the transaction, the unprotected part is still subject to curtailment.

The **Dependent System's** CAs will be required to compensate the **Controlling System's** CAs, or PSEs operating in these areas, where applicable, for all charges incurred in acquiring replacement energy including transmission charges consistent with existing CA-CA tariffs. Generators raised for LEER shall be paid in accordance with local tariffs and control area agreements or at the prevailing emergency energy price where applicable. The SCs/CAs with generators being reduced for LEER shall be compensated in accordance with local tariffs and control area agreements. Where applicable, the **Dependent System's** CAs will recover the expenses based on their current settlement practices.

If the unit(s) designated as the **controlling action** in the LEER procedure were to trip or become limited or unavailable in any way (e.g., derated or not able to provide additional relief if it has already been dispatched to control an unrelated transmission constraint), the Constrained System's SCs/CAs shall immediately notify the Dependent System's SCs/CAs that the re-dispatching service has been modified or canceled. All transactions designated as replacement energy for the limited/unavailable **controlling transaction** shall be canceled immediately.

The Dependent System's SC shall provide periodic updates via the SCIS as the level of **dependency** changes and as changes occur in **dependent transactions**. When the transmission system is no longer constrained, the Constrained System's SC/CA shall notify all other SCs/CAs that transactions can resume and re-dispatch service can be discontinued.

At any point in the execution of the procedure:

- The **Dependent System's** Security Coordinator must cancel the LEER procedure when it is determined that the **dependency** no longer exists. The **Dependent System's** SCs/CAs, or PSEs operating in those areas, where applicable, are responsible for canceling the emergency energy purchase that replaced the **controlling action**, after concurrence by the **Constrained System's** SCs/CAs that relief is no longer required, or that dependence no longer exists.

- The **Constrained System's** Security Coordinator must cancel LEER procedures if the system constraint is relieved when the **controlling action** is terminated. The **Constrained System's** SC/CA is responsible for notifying all parties once system constraints are relieved.

- The **Controlling System's** Security Coordinator must cancel LEER procedures if the controlling unit is no longer available for re-dispatch, has tripped off-line, or in the case an
“INC” unit is derated, or has been reduced (raised in the case of a “DEC” unit) to control a separate constrained facility; unless alternative re-dispatch can be immediately implemented.

• The Security Coordinator supplying emergency energy to replace the controlling action can cancel LEER procedures if the replacement energy becomes unavailable.

**LEER Procedure**

1. Lake Erie SCs/CAs report dependence on transactions and request a conference call using the SCIS “System Emergency” messaging page.

2. Dependent System's SCs/CAs summarize dependency during morning conference call (LEER Hotline).

3. Lake Erie SCs/CAs discuss projected constraints and how transfers to the dependent system impact constraints.

4. Dependent System's SCs/CAs discuss controlling actions and identify dependent transactions with Constrained System's SCs/CAs. SCs/CAs with dependency should:
   - Note Dependent Transaction Identification. Transaction must be entered into NERC Interchange Distribution Calculator (IDC) prior to becoming a candidate for LEER Procedure;
   - Discuss Control Area Source and Sinks of Dependent Transactions to determine GSF/PTDF/OTDF effect;
   - State MW amount of Dependent Transaction – list maximum when transaction MW profile varies.

   *This discussion does not have to be part of the initial conference call.*

5. The Constrained System's SCs/CAs will discuss available controlling actions and updated GSF/PTDF/OTDF effects based on current system topology.

   *This discussion does not have to be part of the initial conference call.*

6. The Constrained and Dependent System's SCs/CAs will agree on which dependent transactions are protected based on the controlling action. The net MW effect of the controlling action must equal the effect of the dependent transactions.

7. The Dependent System's SCs/CAs will arrange for emergency replacement energy in the amount of the controlling action when the agreed upon action is to lower generation. Dependent transactions become protected transactions once re-dispatch begins.

8. The Constrained System's SC/CA will notify other SCs/CAs via the SCIS when the LEER procedure is implemented and provide information including the controlling action,
the protected transactions, and the anticipated duration of the constraint. Periodic updates by either the Constrained or Dependent System's SCs regarding system conditions are to be provided via the SCIS “System Emergency” messaging page as system conditions permit.
APPENDIX A: DEFINITIONS AND ABBREVIATIONS

DEFINITIONS

**Constrained System** - The Control Area (and associated Security Coordinator) with a transmission limitation, which may curtail Dependent System’s transactions through TLR actions.

**Controlling Action(s)** - INC/DEC generation change that creates a LEER controlling transaction.

**Controlling System** - The Control Area (and associated Security Coordinator) with the re-dispatch option to control a constraint (not necessarily constrained system).

**Controlling Transaction** - The counter-flow transaction that effectively nullifies the protected transaction's effect on the constrained flow gate.

**DEC Unit** - Generator(s) associated with a controlling transaction that lowers its level of generation in a re-dispatch action.

**Dependency** - Forecasted Peak Load (MW) – Committed Available Resources (MW) – Voltage Reduction MW – Interruptible/Curtailable Load (MW).

**Dependent System** - The Control Area (and associated Security Coordinator) that is dependent upon an import transaction for meeting internal firm load requirements and is in jeopardy of curtailing firm load.

**Dependent Transaction(s)** - Transactions required to serve firm load, which if curtailed will immediately result in load curtailment.

**Energy Management System (EMS)** – A tool used by transmission operators to monitor and control operation of their transmission systems.

**Flowgate** – A transmission facility (line, transformer, etc.), or collection of facilities, that frequently are involved in constraints to the transfer of power due to thermal, voltage, or dynamic stability limitations.

**Generation Shift Factor (GSF)** - MW effect on a flowgate resulting from the change in MW output of a generator(s).

**INC Unit** - Generator(s) associated with a controlling transaction that raises its level of generation in a re-dispatch action.

**Interchange Distribution Calculator (IDC)** – A tool developed under the North American Electric Reliability Council (NERC) sponsorship for guiding the execution of TLR actions. The IDC also provides other information for operators through a variety of data viewers.
LEER Hotline – The pre-arranged telephone conferencing service by which the LEER participants contact one another to arrange LEER actions.

Outage Transfer Distribution Factor (OTDF) – A measure of the impact of a power transfer transaction on a Flowgate when an outage occurs on another circuit. It is the electric power transfer distribution factor (PTDF) with a specific system facility removed from service (outaged). The OTDF applies only for the post-contingency configuration of the system under study.

Power Transfer Distribution Factor (PTDF) - A measure of the impact of a power transfer transaction on a Flowgate. It is a measure of the responsiveness or change in electrical loadings on system facilities due to a change in electric power transfer from one area to another, expressed in percent (up to 100%) of the change in power transfer. The PTDF applies only for the pre-contingency configuration of the system under study.

Protected Transaction(s) - The Dependent Transaction(s) protected against curtailment by implementation of LEER.

Purchasing-Selling Entity (PSE) – One who buys, sells, and arranges for the transfer of electric power in the energy market.

Re-dispatch Option - Generation raised (INC) or lowered (DEC) to control a transmission constraint.

Security Coordinator Information System (SCIS) – The Internet-based communication service provided to Security Coordinators by the NERC.

Sink – Collectively, the DEC unit and the Control Area in which it resides.

Source – Collectively, the INC unit and the Control Area in which it resides.

Transmission Loading Relief (TLR) – The Transmission Loading Relief procedures developed jointly by the market and reliability sectors of the electric industry, under the sponsorship of NERC.

ABBREVIATIONS

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<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>CA</td>
<td>Control Area</td>
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<td>EMS</td>
<td>Energy Management System</td>
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<td>GSF</td>
<td>Generation Shift Factor</td>
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<td>IDC</td>
<td>Interchange Distribution Calculator</td>
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<td>LEER</td>
<td>Lake Erie Emergency Re-dispatch</td>
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<td>Abbreviation</td>
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<td>OTDF</td>
<td>Outage Transfer Distribution Factor</td>
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<td>PSE</td>
<td>Purchasing-Selling Entity</td>
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<td>PTDF</td>
<td>Power Transfer Distribution Factor</td>
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<tr>
<td>SC</td>
<td>Security Coordinator</td>
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<tr>
<td>SCIS</td>
<td>Security Coordinator Information System</td>
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<td>TLR</td>
<td>Transmission Loading Relief</td>
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APPENDIX B: LEER PROCEDURE EXAMPLE

Limiting facility – actual overload on the Kammer 500/345 kV transformer (AP) for the loss of the Belmont 500/345 kV transformer (AP). Consumers Energy (in MECS Control Area) is purchasing 100 MW of energy from New York and is the Dependent System. The MECS transaction from NY contributes 15 MW (100 x .15) to the constraint. The most effective controlling actions are to reduce Fort Martin and increase Gavin (GSF = 41%) generation, under AP and AEP control, respectively. Not implementing LEER would result in the curtailment of 100 MW of MECS load.

1. MECS (Dependent System) Control Area announces extent of dependency using Security Coordinator Information System.

2. Lake Erie SCs/CAs review projected system constraints and how MECS dependency is affected.
   - PTDF and GSF Viewers used to determine general distribution factor effect.
   - EMS or off-line powerflow used to determine appropriate controlling actions based on current system conditions (more accurate GSF developed).

3. MECS (Dependent System) Control Area initiates conference call via LEER Hot Line.

4. AP (Constrained System) Security Coordinator identifies projected constraint and appropriate controlling action. AP anticipates that the Kammer 500/345 kV transformer must be relieved by 200 MW. The dependent transactions have a 15% effect on the Kammer 500/345 kV transformer. GSFs indicate that most effective controlling action is to lower AP generation and raise AEP generation. AP and AEP are identified as the Controlling System Security Coordinators. In this instance AP has a dual role. Other SCs/CAs identify additional potential sources of replacement energy.

5. MECS (Dependent System) Security Coordinator, AP (Constrained and Controlling System) Security Coordinator, and AEP (Controlling System) Security Coordinator are to agree on the GSF effect of controlling action, replacement energy and identified dependent transactions. SCs/CAs agree that the appropriate controlling action is to reduce Fort Martin Generation (GSF = 41%). SCs/CAs must include the effect of emergency replacement energy on constrained facility. If AEP is determined to be the source of replacement energy, the analysis would indicate that Fort Martin Generation must be reduced by 37 MW to relieve constraint (15MW/.41) MECS arranges for 37MW of replacement energy, to be supplied from AEP, to replace the controlling action on the AP system. Discussion does not have to be part of the initial conference call. MECS is responsible for the costs of the replacement energy.

6. AP (Constrained System) Security Coordinator identifies protected transactions, controlling action, and the anticipated duration of the constraint using the SCIS.
7. AP (Constrained Security Coordinator) notifies SCs/CAs via SCIS once constraint is relieved.

8. AP (Constrained System) Security Coordinator notifies the LEER participants including AEP (Controlling System) and MECS (Dependent System) via telephone (LEER Hotline) once controlling action is no longer required.