1. **INTRODUCTION**

1.1. The purpose of the LAFA Transmission Planning Process document is to serve as a template for the annual transmission planning activities of LAFA, which will ensure (i) compliance with NERC Reliability Standards and SPP Criteria regarding transmission planning, and (ii) consistent, repeatable evaluation of the LAFA transmission system to ensure that all facilities are reviewed in accordance with Good Utility Practice.

2. **THE BASIC PROCESS**

2.1. The LAFA Transmission Planning Process shall consist of the following steps: NERC TPL Analyses, Solution Testing, and Planning Authority Coordination.

2.2. The NERC TPL standards should be reviewed prior to performing the TPL Assessments. The review should include:

   2.2.1. Verifying that the versions of standards being used for the assessment are the current in-effect versions.

   2.2.2. Reviewing interpretations of the standards or their requirements.

3. **The LAFA transmission planning process covers LAFA facilities subject to the TPL standards MODEL REVIEW**

3.1. Each model used in the power flow studies shall be reviewed to ensure that the model meets the requirements of the TPL standards.

3.2. The review shall ensure that the models:

   3.2.1. Cover the critical system conditions and study years as deemed appropriate by LAFA.

   3.2.2. For TPL-001 only, have established normal (pre-contingency) operating procedures in place.

   3.2.3. Have all projected firm transfers modeled.

   3.2.4. Include existing and planned facilities.

   3.2.5. Include reactive power resources.
4. **TPL-001 ASSESSMENT**

4.1. **Frequency of Assessment** – The TPL-001 Assessment shall be conducted on an annual basis.

4.2. **Planning Horizon** – The TPL-001 Assessment shall be conducted on the set of SPP power flow models developed by the Model Development Working Group for use in the SPP Transmission Expansion Plan process. At a minimum, all cases from planning years one through five and at least two summer peak cases and one winter peak case for years six through ten shall be reviewed. The SPP models shall be basis for all analyses conducted as part of the LAFA Transmission Planning Process.

4.3. **Method of Analysis** - The TPL-001 Assessment shall be conducted by performing both a voltage violation screening and a thermal violation screening on the series of power flow models being evaluated. The TPL-001 Assessment shall be performed consistent with Section 3.4.1.1 of the SPP Criteria.

   4.3.1. The voltage at each LAFA bus shall be examined to determine if any LAFA busses exceed plus or minus five percent (+/- 5%) of their Applicable Rating under normal (no contingency) conditions. LAFA may develop additional criteria for voltage excursions based upon operational experience. Such criteria shall be at least as restrictive as the SPP Criteria in order to be used in the TPL-001 Assessment.

   4.3.2. The loadings on each LAFA line and transformer shall be examined to determine if any LAFA Transmission System Elements exceed 100% of their Applicable Rating under normal (no contingency) conditions. LAFA may develop additional criteria for thermal loading violations based upon operational experience. Such criteria shall be at least as restrictive as the SPP Criteria in order to be used in the TPL-001 Assessment.

4.4. **Development of Mitigation Plans**

   4.4.1. **Thermal Violations** – If any LAFA Transmission System facilities exceed 100% of their Applicable Rating, LAFA shall develop a mitigation strategy such that all violations are mitigated in the power flow model where the thermal violation was identified. Mitigation strategies may include (but are not limited to): normal (pre-contingency) operating procedures, Transmission System reconfiguration, generation redispatch, and/or new Transmission System facilities (including additional reactive power resources).

   4.4.2. **Voltage Violations** – If any LAFA Transmission System facilities exceed plus or minus five percent (+/- 5%) of their Applicable Rating under normal (no contingency) conditions, LAFA shall develop a mitigation strategy such that all violations are mitigated in the power flow model where the voltage violation was identified. Mitigation strategies may include (but are not limited to): normal (pre-contingency) operating procedures, Transmission System reconfiguration, generation redispatch, and new Transmission System facilities (including additional reactive power resources).

   4.4.3. Mitigation plans shall be tested in the power flow models to verify that the solution(s) fully address the identified violation(s).
4.5. Documentation of Assessment – LAFA shall develop a report of the results of its TPL-001 Assessment. Such report shall include:

4.5.1. A list of the power flow models evaluated and the associated criteria for the determination of thermal and voltage violations.

4.5.2. A list of all thermal and voltage violations identified for all evaluated power flow models.

4.5.3. A list of all mitigation strategies developed to address the aforementioned violations.

4.5.4. An implementation schedule for all mitigation strategies, including lead times for construction.

4.5.5. A discussion of required in-service dates of facilities.

4.6. Coordination with Planning Authority – LAFA shall make its TPL-001 Assessment, found in the LAFA Transmission Planning Assessment report, available to the Planning Authority upon request.

5. **TPL-002 ASSESSMENT**

5.1. **Frequency of Assessment** – The TPL-002 Assessment shall be conducted on an annual basis.

5.2. **Planning Horizon** – The TPL-002 Assessment shall be conducted on the set of SPP power flow models developed by the Model Development Working Group for use in the SPP Transmission Expansion Plan process. At a minimum, all cases from planning years one through five and at least two summer peak cases and one winter peak case for years six through ten shall be reviewed. The SPP models shall be basis for all analyses conducted as part of the LAFA Transmission Planning Process.

5.3. **Method of Analysis** - The TPL-002 Assessment shall be conducted by performing both a voltage violation screening and a thermal violation screening on the series of power flow models being evaluated. The TPL-002 Assessment shall be performed consistent with Section 3.4.1.2. of the SPP Criteria.

5.3.1. All AC contingency analyses are simulated as bus-to-bus contingencies (single branch per contingency).

5.3.1.1. Include a discussion in the final report of why any contingencies not simulated would be less severe than the contingencies simulated.

5.3.2. During the AC contingency analysis, the loadings on each LAFA line and transformer shall be examined to determine if any LAFA elements exceed 100% of their Applicable Rating under the loss of a single Bulk Electric System element. LAFA may develop additional criteria for thermal loading violations based upon operational experience. Such criteria shall be at least as restrictive as the SPP Criteria in order to be used in the TPL-002 Assessment.
5.3.3. During the AC contingency analysis, the voltage at each LAFA bus shall be examined to determine if any LAFA busses exceed plus five percent to minus ten percent (+5%/-10%) of their Applicable Rating under the loss of a single Bulk Electric System element. LAFA may develop additional criteria for voltage excursions based upon operational experience. Such criteria shall be at least as restrictive as the SPP Criteria in order to be used in the TPL-002 Assessment.

5.4. Development of Mitigation Plans

5.4.1. Thermal Violations – If any LAFA Transmission System facilities exceed 100% of their Applicable Rating for the loss of a single Bulk Electric System element, LAFA shall develop a mitigation strategy such that all violations are mitigated in the power flow model where the thermal violation was identified. Mitigation strategies may include (but are not limited to): normal (pre-contingency) operating procedures, Transmission System reconfiguration, generation redispatch, and/or new Transmission System facilities (including additional reactive power resources).

5.4.2. Voltage Violations – If any LAFA Transmission System facilities exceed plus five percent to minus ten percent (+5%/-10%) of their Applicable Rating under the loss of a single Bulk Electric System element, LAFA shall develop a mitigation strategy such that all violations are mitigated in the power flow model where the voltage violation was identified. Mitigation strategies may include (but are not limited to): normal (pre-contingency) operating procedures, Transmission System reconfiguration, generation redispatch, and new Transmission System facilities (including additional reactive power resources).

5.4.3. Mitigation plans shall be tested in the power flow models to verify that the solution(s) fully address the identified violation(s).

5.5. Documentation of Assessment – LAFA shall develop a report of the results of its TPL-002 Assessment. Such report shall include:

5.5.1. A list of the power flow models evaluated and the associated criteria for the determination of thermal and voltage violations.

5.5.2. A list of all thermal and voltage violations identified for all evaluated power flow models.

5.5.3. A list of all mitigation strategies developed to address the aforementioned violations.

5.5.4. An implementation schedule for all mitigation strategies, including lead times for construction.

5.5.5. A discussion of required in-service dates of facilities.

5.6. Coordination with Planning Authority – LAFA shall make its TPL-002 Assessment, found in the LAFA Transmission Planning Assessment report, available to the Planning Authority upon request.
6. **TPL-003 ASSESSMENT**

6.1. **Frequency of Assessment** – The TPL-003 Assessment shall be conducted on an annual basis.

6.2. **Planning Horizon** – The TPL-003 Assessment shall be conducted on the set of SPP power flow models developed by the Model Development Working Group for use in the SPP Transmission Expansion Plan process. At a minimum, all cases from planning years one through five and at least two summer peak cases and one winter peak case for years six through ten shall be reviewed. The SPP models shall be basis for all analyses conducted as part of the LAFA Transmission Planning Process.

6.3. **Method of Analysis** - The TPL-003 Assessment shall be conducted by performing both a voltage violation screening and a thermal violation screening on the series of power flow models being evaluated. The TPL-003 Assessment shall be performed consistent with Section 3.4.1.3 of the SPP Criteria.

6.3.1 All AC contingency analyses are simulated as bus-to-bus contingencies (two branches per contingency).

6.3.1.1 Include a discussion in the final report of why any contingencies not simulated would be less severe than the contingencies simulated.

6.3.2 During the AC contingency analysis, the loadings on each LAFA line and transformer shall be examined to determine if any LAFA elements exceed 100% of their Applicable Rating under the loss of two or more Bulk Electric System elements. LAFA may develop additional criteria for thermal loading violations based upon operational experience. Such criteria shall be at least as restrictive as the SPP Criteria in order to be used in the TPL-003 Assessment.

6.3.3 During the AC contingency analysis, the voltage at each LAFA bus shall be examined to determine if any LAFA buses exceed plus five percent to minus ten percent (+5%/-10%) of their Applicable Rating under the loss of two or more Bulk Electric System elements. LAFA may develop additional criteria for voltage excursions based upon operational experience. Such criteria shall be at least as restrictive as the SPP Criteria in order to be used in the TPL-003 Assessment.

6.4 **Development of Mitigation Plans**

6.4.1 Thermal Violations – If any LAFA Transmission System facilities exceed 100% of their Applicable Rating for the loss of two or more Bulk Electric System elements, LAFA shall develop a mitigation strategy such that all violations are mitigated in the power flow model where the thermal violation was identified. Mitigation strategies may include (but are not limited to): normal (pre-contingency) operating procedures, Transmission System reconfiguration, generation redispatch, and/or new Transmission System facilities (including additional reactive power resources).
6.4.2 Voltage Violations – If any LAFA Transmission System facilities exceed plus five percent to minus ten percent (+5%/-10%) of their Applicable Rating under the loss of two or more Bulk Electric System elements, LAFA shall develop a mitigation strategy such that all violations are mitigated in the power flow model where the voltage violation was identified. Mitigation strategies may include (but are not limited to): normal (pre-contingency) operating procedures, Transmission System reconfiguration, generation redispatch, and/or new Transmission System facilities (including additional reactive power resources).

6.4.3 Mitigation plans shall be tested in the power flow models to verify that the solution(s) fully address the identified violation(s).

6.5 Documentation of Assessment – LAFA shall develop a report of the results of its TPL-003 Assessment. Such report shall include:

6.5.1 A list of the power flow models evaluated and the associated criteria for the determination of thermal and voltage violations.

6.5.2 A list of all thermal and voltage violations identified for all evaluated power flow models.

6.5.3 A list of all mitigation strategies developed to address the aforementioned violations.

6.5.4 An implementation schedule for all mitigation strategies, including lead times for construction.

6.5.5 A discussion of required in-service dates of facilities.

6.6 Coordination with Planning Authority – LAFA shall make its TPL-003 Assessment, found in the LAFA Transmission Planning Assessment report, available to the Planning Authority upon request.

7. TPL-004 ASSESSMENT

7.1 Frequency of Assessment – The TPL-004 Assessment shall be conducted on an annual basis. Power flow studies to support the TPL-004 assessment shall be conducted at least once every three years.

7.2 Planning Horizon – The TPL-004 Assessment shall be conducted on the set of SPP models as developed by the Model Development Working Group for the SPP Transmission Expansion Plan process for years one through five. At a minimum, the summer peak and winter peak cases for years one through five shall be reviewed. The SPP models shall be the basis for all analyses conducted as part of the LAFA Transmission Planning Process.

7.3 Method of Analysis - The TPL-004 Assessment shall be conducted by performing both a voltage violation analysis and a thermal violation analysis on the series of power flow models being evaluated.

7.3.1 The contingencies evaluated under TPL-004 shall be evaluated using an AC power flow method. Include a discussion in the final report of why any
contingencies not simulated would be less severe than the contingencies simulated.

7.3.2 Should LAFA transmission system conditions warrant, LAFA shall evaluate and identify contingencies that may not be apparent within the representation of the LAFA transmission model. (e.g. common ROW, multi-circuit transmission structure).

7.3.3 The loadings on each LAFA line and transformer shall be examined to determine if any LAFA elements exceed 100% of their Applicable Rating under an extreme event. Unless otherwise specified, LAFA shall use the SPP Criteria 3 definition for Applicable Rating (TPL-004) for both voltage excursion and thermal loading in the determination of any violations. The analysis shall include the loss of all generation a single generating station plus the loss of any two elements of the LAFA Transmission System. The voltage at each LAFA bus shall be examined to determine if any LAFA busses exceed their Applicable Rating under Category D conditions. Unless otherwise specified, LAFA shall use the SPP Criteria 3 definition for Applicable Rating (TPL-004) for voltage excursion in the determination of any voltage violations.

7.4 Documentation of Assessment – LAFA shall develop a report of the results of its TPL-004 Assessment. Such report shall include:

7.4.1 A list of all thermal and voltage violations identified for all evaluated power flow models.

7.5 Coordination with Planning Authority – LAFA shall make its TPL-004 Assessment, found in the LAFA Transmission Planning Assessment report, available to the Planning Authority upon request.

8. SOLUTION TESTING

8.1 Reverse order testing – Solution testing shall occur such that the mitigation plans developed in the TPL-003 assessment shall be placed into the power flow models and the models shall be run as if conducting a TPL-002 assessment. To the extent there are unmitigated conditions resulting from the TPL-003 mitigation schemes, the TPL-002 mitigation schemes shall be added to the models and then be tested to see if any violations occur under a TPL-001 analysis with both the TPL-003 and revised TPL-002 plans in the models. If any TPL-001 violations still exist, the mitigation plans for TPL-001 shall be added until no violations occur.

8.2 Primary order testing - Solution testing shall occur such that the mitigation plans developed in the TPL-001 assessment shall be placed into the power flow models and the models shall be run as if conducting a TPL-002 assessment. To the extent there are unmitigated conditions resulting from the TPL-001 mitigation schemes, the TPL-002 mitigation schemes shall be added to the models and then be tested to see if any violations occur under a TPL-003 analysis with both the TPL-001 and revised TPL-002 plans in the models. If any TPL-003 violations still exist, the mitigation plans for TPL-003 shall be added until no violations occur.
8.3 LAFA shall consider internal planning considerations (ROW, ease of construction, etc.) in making the final decision on the optimal set of mitigation plans to use as the basis for its Transmission Expansion Plan.

9. **FINAL REPORTING**

9.1 LAFA shall publish a final report based on the results of the TPL Assessments. The report shall contain (at a minimum):

9.1.1 A list of the power flow models evaluated and the associated criteria for the determination of thermal and voltage violations.

9.1.2 A list of all thermal and voltage violations identified for all evaluated power flow models for each TPL Assessment.

9.1.3 A list of all mitigation strategies developed to address the aforementioned violations for each TPL Assessment.

9.1.4 An optimized Transmission Capital Improvements Plan, based on the results of the Solution Testing Process.

9.1.5 An implementation schedule for the Transmission Capital Improvements Plan, including lead times for construction.

9.1.6 A discussion of required in-service dates of facilities.

10. **COORDINATION WITH PLANNING AUTHORITY**

LAFA shall make its LAFA Transmission Planning Assessment report available to the Planning Authority upon request, or as part of the Planning Authority Transmission Planning Process, as needed.

11. **Document Modifications**

The following changes have been made to this document since its initial creation.

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<tr>
<th>Date</th>
<th>Change Author</th>
<th>Change Approval</th>
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<tr>
<td>05/01/2008</td>
<td>J. Chiles</td>
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<td>Development of initial Document</td>
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<tr>
<td>07/01/2008</td>
<td>J. Chiles</td>
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<td>Modification to Planning Authority references, Applicable Rating definition, removal of Category descriptions.</td>
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<td>07/06/2011</td>
<td>J. Stewart</td>
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<td>Remove DC screening analysis from</td>
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<tr>
<td>09/18/2012</td>
<td>J. Stewart</td>
<td>Modify title and define TPL-004 models to be used in analysis</td>
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<tr>
<td>11/17/2013</td>
<td>J. Stewart</td>
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