GENERATOR TESTING PROCEDURES

1.0 PURPOSE

1.1 Explanation of Requirements

KPP members receive transmission service under the Southwest Power Pool (SPP) tariff. Under this transmission service KPP member generation is used to provide needed capacity to assure reliable service both to KPP members and other users of SPP transmission service. Section 12.1 of the SPP criteria addresses how users of SPP transmission service must rate their generating capability and how they must verify that capability by periodic testing. As a customer of SPP transmission service, KPP must annually report the ratings of member generation to SPP. KPP members that own generation are responsible for establishing and testing their generation capability per this procedure.

1.2 Rating of Generating Capability

The SPP criteria require that generation capability be verified by testing. The results of generation capability testing will be used to provide updated ratings of generation capacity. Generators may not have a rated capability greater than the net generator capability recorded during the most recent valid Generation Capability Test. The Generation Capability Test Verification Worksheet is attached as Appendix 1.

1.3 Verifying Operability of Generation

The SPP criteria require that each generating unit be tested periodically to demonstrate the ability to achieve its nominal generating capability. The Generation Operability Test Verification Worksheet is attached as Appendix 2.

1.4 Generation Capacity for Purposes of KPP Capacity Payments

Annually, KPP approves the amount of revenue that will be paid to members for their generation capacity. This amount shall be proportionally allocated to all members' generation capacity that has been demonstrated by the most recent Generation Capability Test. Units that have not performed generation capability testing or operability testing within the required frequency will not receive capacity payments the following year.

2.0 SCOPE

This procedure is applicable to all KPP members who own and operate generating units. Testing results for KPP generators considered Designated Network Resources (DNRs), under the SPP transmission service to KPP, will be reported to SPP as required. The results for these DNR units will also be used by KPP for resource planning and decisions regarding future generation resources.

3.0 RESPONSIBILITY

It is the responsibility of the KPP Members to conduct the required testing for their generating units.

4.0 Frequency of Testing

4.1 Generation Capability Test

SPP criteria require that Generation Capability Testing occur at least once every 3 years. Because it may be occasionally difficult to meet test condition requirements during unusually cool summers, members may elect to perform a Generation Capability Test on its generating units once every two years or even every year. In addition to the required Generation Capability Test frequency of once every three years, the SPP criteria also require that testing be performed if any unit undergoes a physical or operational modification which could affect generator capability. Should the unit undergo such modifications, the member must perform the Generation Capability Test for that unit as soon as practical, given appropriate summer conditions.

4.2 Generation Operability Test

SPP criteria require that Generation Operability Testing occur every year during the summer at a minimum of 90% of the generation capability rating. SPP criteria also allows for use of any normal generator operation during the summer that meets the test duration and criteria to be used instead of the Generation Operability Test.

Table 1 Summary of Test Frequency Requirements

Test	Required Frequency	Recommended Frequency	Additional Testing	Notes
Generation Capability Test	Every 3 years	Every 2 years	Following modifications that affect capability	Used to determine Capacity Rating
Generation Operability Test	Every year during summer	N/A	N/A	Can use any hour of normal operation that meets test requirements

5.0 PROCEDURE/METHODOLOGY

5.1 Generation Capability Test (Use Generation Capability Test Verification Worksheet, Appendix 1)

5.1.1 Scheduling

Notify KPP scheduling as soon as practical prior to performing testing, preferably, provide notification prior to 8 AM the day before the test is to be performed. Members should bill KPP for generation costs related to testing.

5.1.2 Settling Period (Steam Units Only)

Steam units must generate within 5% of their rated capability during a settling period prior to the Generation Capability Test. During the settling period only minor changes in unit controls shall be made to bring the unit into normal, steady-state operation. The settling period shall be at least 2 hours for steam units rated greater than 100 MW. The settling period shall be at least 1 hour for steam units rated less than 100 MW. A settling period is NOT REQUIRED for all other types of units.

5.1.3 Test Period

The test period shall be 2 hours for steam units rated greater than 100 MW. For all other units, including steam units rated less than 100 MW, the test period shall be 1 hour.

5.1.4 Test Conditions

Generation Capability Testing shall be performed when ambient temperatures are within 10 degrees Fahrenheit of rating dry-bulb temperature. The minimum testing ambient temperatures for each KPP member are shown in Table 2.

Table 2. Minimum dry-bulb ambient test temperature

KPP Generating City	Minimum Dry-Bulb Ambient Test Temperature (in degrees Fahrenheit)
Attica	92.5
Augusta	89.7
Burlington	87.5
Chanute	88.4
Clay Center	89.6
Ellinwood	89.8
Erie	88.4
Girard	89.0
Holton	87.1
Horton	87.5
Iola	88.4
Kingman	91.1
Minneapolis	91.3
Oxford	90.3
Sabetha	87.8
Sterling	90.0
Wellington	90.3
Winfield	90.3

5.1.5 Simultaneous Testing Requirements

Where generating units are dependent upon common systems such as fuel systems, cooling systems, auxiliary power system, etc., the total output of the dependent units shall be tested simultaneously.

5.1.6 Testing Assistance

KPP members are expected to perform testing to comply with requirements. Witnessing of Generation Capability Testing is not

required. However, if a member would like help or assistance performing testing they may contact KPP.

5.1.7 Data that Must be Recorded

SPP criteria requires the following data to be recorded during the Generation Capability Test:

- Meteorological data (may use site data or nearest official weather station)
  - Dry-bulb temperature
  - Barometric pressure
  - Wet-bulb temperature (may record relative humidity instead)
- Condenser cooling water inlet temperature (Steam units only)
- Generation Output
  - Net Generation
    - Can be calculated by subtracting auxiliary load from gross generation
  - Gross Generation
    - Can be calculated by adding auxiliary load to net generation
  - Auxiliary Load
    - If this is not individually metered it may be calculated based upon vendor information, measurement of station power before and after testing, or using data from similar units.

5.1.8 Submission of Test Data

Submit completed Generation Capability Test Verification Worksheet, along with any supporting test data to KPP via mail, email or fax.

5.2 Generation Operability Test (Use Generation Operability Test Verification Worksheet, Appendix 2)

5.2.1 Scheduling

Notify KPP scheduling as soon as practical prior to performing testing, preferably, provide notification prior to 8 AM the day before the test is to be performed. Members should bill KPP for generation costs related to testing.

5.2.2 Test Period

The test period shall be 1 hour for all units

5.2.3 Test Conditions

Generation Operability Tests shall be performed during the months of June, July, August or September, the summer season. There are no minimum ambient conditions required for the testing. However, it is recommended that ambient dry-bulb temperature be recorded.

5.2.4 Substitution of Actual Generator Operation

Any normal hour of unit operation that is 90% or more of the units verified generation capability rating, during the summer season, may be substituted for the Generator Operability Test, provided that the Generator Operability Test Verification Worksheet in Appendix 2 is completed and submitted.

5.2.5 Submission of Test Data

Submit completed Generation Operability ability Test Verification Worksheet, along with any supporting test data to KPP via mail, email or fax.

Generation Capability Test Verification Worksheet
KPP Generation Testing Procedures O-1 revision 2
Appendix 1

Checklist

- Determine if other units must be tested simultaneously (see section 5.1.5)
- Review other testing requirements (see section 5.1)
- KPP scheduling has been notified of planned testing
- Test witnesses have been contacted (if desired)
- Ambient dry-bulb temperature is equal or greater than minimum requirement in table 2
- Complete required settling period (steam units only)

City _____Unit _____ Rating _____kW Date _____

1. List any other Units which must be tested simultaneously (see section 5.1.5)

_____

Record the following:

Barometric Pressure _____ Wet Bulb Temperature ____F (OR Relative Humidity _____%)

Test Data (record applicable data approximately every 15 minutes)

Was Auxiliary Load Measured (yes or no)? _____ [If calculated attach calculation and method]

	Start	1	2	3	End	Average
Time						
Temperature (dry-bulb) F						
Gross Generation (kW)[1]						
Auxiliary Load (kW)[2]						
Net Generation (kW)[1]						
Gross Generation Meter(kW)[1]		X	X	X		
Auxiliary Load Meterr (kW)[2]		X	X	X		
Net Generation Meter (kW)[1]		X	X	X		
Condenser Cooling Water Inlet (F)[3]						

Notes: 1) Enter register and/or indication if available. If not available mark N/A and calculate in Average location. Attach calculations. **Net Generation (Gross Generation minus Auxiliary Load) will be used for future rated capacity**
2) If Auxiliary Load indication is not available, estimate based upon changes in station load, vendor information, or similar units. See section 5.1.7. Attach calculation and method.
3) Steam units only.

List Test Director and anyone assisting from KPP or other Cities

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Send completed test results to KPP via mail, email (lholloway@kansaspowerpool.org) or fax (316) 264-3434

Generation Operability Test Verification Worksheet
KPP Generation Testing Procedures O-1 revision 2
Appendix 2

Checklist

- Review other testing requirements (see section 5.2)
- KPP scheduling has been notified of planned testing

City _____Unit _____ Rating _____kW Date _____

Was Auxiliary Load Measured (yes or no)? _____ [If calculated attach calculation and method]

Test Data (record applicable data approximately every 15 minutes)

	Start	1	2	3	End	Average
Time						
Temperature (dry-bulb) F						
Gross Generation (kW)[1]						
Auxiliary Load (kW)[2]						
Net Generation (kW)[1]						
Gross Generation Meter(kW)[1]						
Auxiliary Load Meter (kW)[2]						
Net Generation Meter (kW)[1]						

Notes: 1) Enter register and/or indication if available. If not available mark N/A and calculate in Average location. Attach calculations.
2) If Auxiliary Load indication is not available, estimate based upon changes in station load, vendor information, or similar units. See section 5.1.7. Attach calculation and method.

Note: Testing must occur in the Summer Season and be 90% or greater than rated capability

Was Test Data recorded during normal scheduled operation ? _____

Test Director_____

Send completed test results to KPP via mail, email (lholloway@kansaspowerpool.org) or fax (316) 264-3434