

# McClain Network Generation Study

## 8-26-03

This study was performed in order to designate the McClain Energy Facility in McClain County Oklahoma as a new network resource of OGE Energy Corp, pursuant to Sections 29 and 30 of the OG&E Open Access Transmission Tariff.

The system was modeled using the SPP 2003 Summer Peak and the 2003 Winter Peak models. The maximum output of the plant is currently limited to 478 MW in both Summer and Winter seasons by line limitations. Modifications to the base case models were made as shown below to identify system upgrades necessary in order to operate the plant at the maximum capability of the generating facility:

- a. 2003 Summer Peak with McClain generation raised to maximum summer output of 487MW,
- b. 2003 Winter Peak with McClain generation raised to maximum winter output of 526MW.

Any overloads were flagged at 100% of Rate B. Voltage violations were identified at 0.92 per unit and below. Branches in adjacent systems were monitored for overloads. Overloads in the base case were excluded from this analysis. New overloads identified in this study as a result of the higher generator output will be alleviated prior to operation of the plant at the higher levels.

### Generation Assumptions

The following assumptions were made about generation when modeling the 2003 Summer Peak case with McClain at maximum summer output:

- a. McClain Generating 487MW.
- b. Mustang units 1, 2, 3, & 4 were tuned off. The initial output at Mustang in the model was: Mustang 1 at 29MW, Mustang 2 at 51MW, Mustang 3 at 91MW, and Mustang 4 at 248MW.
- c. Muskogee 3 was backed down 68MW to an output of 81MW.

The following assumptions were made about generation when modeling the 2003 Winter Peak case with McClain at maximum winter output.

- a. McClain Generating raised to 526MW.
- b. Seminole 1 was backed down by 83MW to an output of 173MW. Seminole unit 2 output was lowered from 442 MW to 0MW and was turned off.

### Results

#### *1.) 2003 Summer Peak Case:*

The base case was compared to the McClain case and the problems that were a result of the increase McClain generation levels are listed below and in the attached Table 1.

- a. 138kV Czech Hall to Cimarron: Incorrect Rate A & B in the model. The correct rating for Rate A & B is 382MVA. There is no problem.
  - b. 138kV Silver Lake to Braden Park (Panther): Switch T125 is a 1200A switch and has replaced with a 2000 Amp switch. The new Rate A & B is 478MW.
  - c. 138kV Mustang to Morgan Road: Change CTR at Mustang to 2000-5. New rating will be Rate A = 388MVA and Rate B = 444MVA.
  - d. Horseshoe Lake Station to Jones Tap: Replace switches in HLS substation to raise Rate A to 382 MVA and Rate B to 382 MVA.
  - e. Low voltage at the 69kV PL Center Tap with the contingency of the 69kV Shell Tap to Cushing line. In this situation, an Operating Procedure calls for the normally open switch 39 at PL Center Tap would be closed to restore voltage.
- 2.) *2003 Winter Peak Case*: There were two thermal overloads identified in the 2003 Winter Peak Case with the McClain generation at maximum winter output of 520 MW. These overloads are shown below and in the attached Table 2.
- a. McClain to Pleasant Valley 138kV line: Present limits consist of two 2000 amp switches and four 2000 amp breakers at Pleasant Valley. This equipment will be replaced with 3000 amp equipment. The new rating of this line section will be 488 MVA Rate A / 550 MVA Rate B Summer and 622 Rate A / 674 Rate B Winter.
  - b. Sara Road to McClain 138kV line: Present limits are four 2000 amp switches located in the Sara Road substation. These switches will be replaced with 3000 amp equipment. The new rating of this line section will be 488 MVA Rate A / 550 MVA Rate B Summer and 622 Rate A / 674 Rate B Winter.
  - c. Cimarron Substation: Replace seven 2000 amp switches and three 2000 amp breakers to provide operating flexibility to accommodate the new maximum Winter output.

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Reviewed  
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Reviewed  
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Date  
*8/29/03*

**Table 1**  
**Summer 2003 with McClain at maximum Summer output**

## Branch Violations

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*** MUST 6.0 *** TUE, AUG 05 2003 9:24 ***
2003 SPP UPDATE 1 MODELS (APRIL 1,2003)
2003 SUMMER PEAK (B03SP1) BASE CASE
Subsys.File C:\2003Cases\StudyCases\Contingency.sub
Monit.File C:\2003Cases\StudyCases\Contingency.mon
Contin.File C:\2003Cases\StudyCases\Contingency.con
Exclud.File C:\2003Cases\MCClainPP\MUST2\B03SPMcClain478MW.exc
  
```

\*\*\*\*\* Report on violations \*\*\*\*\*

Branches with MVA flow more than 100.0 % of nominal rating

**	From bus	** **	To bus	**							Contingency		
	CKT	TYP			TP	ContMVA	BaseFlow	Rating	Loading%	Ncon			
54894	CZECHAL4	138	54898	CIMARON4	138	1	LN	295.3	242.8	287.0	102.9	168	54853 DVISION4 138 54863 HAYMAKR4 138 1
54894	CZECHAL4	138	54898	CIMARON4	138	1	LN	299.3	242.8	287.0	104.3	183	54863 HAYMAKR4 138 54898 CIMARON4 138 1
54852	SLVRLAK4	138	54854	PANTHER4	138	1	LN	304.4	195.3	287.0	106.1	195	54873 LONEOAK4 138 54879 NORTWST4 138 1
54894	CZECHAL4	138	54898	CIMARON4	138	1	LN	334.8	242.8	287.0	116.6	219	54902 MCCLAIN4 138 54929 PLVALLY4 138 1
54840	JONESTP4	138	54941	HSL	4	138	1	LN	297.2	242.0	103.6	276	54941 HSL 4 138 54973 RENO 4 138 1

**Table 2**  
**Winter 2003 with McClain at maximum Winter output**

## Branch Violations

```

*** MUST 6.0 *** TUE, AUG 05 2003 10:03 ***
2003 SPP UPDATE 1 MODELS (APRIL 1,2003)
2003 WINTER PEAK (B03WP1) BASE CASE
Subsys.File C:\2003Cases\StudyCases\Contingency.sub
Monit.File C:\2003Cases\StudyCases\Contingency.mon
Contin.File C:\2003Cases\StudyCases\Contingency.con
Exclud.File C:\2003Cases\McClainPP\MUST2\B03WPMcClain478MW.exc
  
```

\*\*\*\*\* Report on violations \*\*\*\*\*

Branches with MVA flow more than 100.0 % of nominal rating

**	From bus	** **	To bus	T	ContMV	BaseFlo	Rating	Loadin	Nco	Contingency
	** CKT TYP			P	A	w		g%	n	
54902	MCCLAIN4 138 54929	PLVALLY4 138 1		LN	504.9	372.4	478.0	105.6	215	54895 SARA 4 138 54902 MCCLAIN4 138 1
54895	SARA 4 138 54902	MCCLAIN4 138 1		LN	506.9	132.2	478.0	106.1	219	54902 MCCLAIN4 138 54929 PLVALLY4 138 1