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COLORADO SPRINGS UTILITIES RESPONSE TO Xcel ENERGY INTERCONNECTION SYSTEM IMPACT STUDY REQUEST # GI-2007-12, RESTUDY 1
(August 6, 2009)

On June 15, 2009 Xcel Energy released a restudy of a System Impact Study evaluating the effect of a 250 MW wind power injection at Jackson Fuller substation (GI-2007-12). Colorado Springs Utilities (SU) was identified in that study as an affected party, with a total of four lines overloaded under contingency. Additionally, the Xcel restudy found several SU owned lines to be benchmark overloaded without the proposed injection at Fuller substation.

This study will reevaluate the SU overloads in light of new SU load forecast data and a revised generation dispatch profile for Colorado Springs Utilities.

BASE CASE CHANGES AND STUDY SCOPE

SU evaluated the 2011 summer peak base case used by Xcel to perform the Impact Study, and decided that there were two significant changes that should be made to the SU model. The changes were as follows:

(1) SU completed a new, revised distribution system load forecast in June 2009. The new forecast was based upon the approved 2009 SU corporate forecast. Load projections were reduced, and the location of new load growth was modified based on recent trends. Loads in the model were revised. The table in Appendix C details the changes made to SU loads in the Xcel base case.

(2) The local generation dispatched by Colorado Springs Utilities was modeled in the Xcel base case as approximately 185 MWs above expected requirements. Generation levels were reduced in the model. The largest reduction in generation was at Front Range Power, and reflects the fact that the Front Range Power Purchase Agreement with PSCo expires in 2009. There is no firm transaction to replace it. The balance of the dispatch level reduction was made so that SU generation plus imports would match projected SU load. The table in Appendix B details the changes made to generator output levels in the Xcel base case.

Both changes above are consistent with SU's annual transmission modeling process.

After the base case was modified, studies were run with and without injection at Fuller, for both the case with and the case without the Midway to Waterton 345kV line in service. A single contingency analysis was run for zones 700, 704, 752 and 757.

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Monitored elements included all Colorado Springs Utilities facilities as well as all SU tie lines.

RESULTS

With the modifications to the base case completed, all SU benchmark overloads were eliminated for both the case with and the case without the Midway to Waterton line in service.

The case with the Midway-Waterton line in service and a 250MW injection at Fuller substation also resulted in no overloads on the SU system.

For the case with the Midway-Waterton line not in service, a 250MW injection at Fuller resulted in significant overloads on four SU owned lines.

Appendix A includes a tabular comparison of the loading in the Xcel study versus the loading in the SU revised study.

CONCLUSIONS

It is apparent that the Midway to Waterton project is critical to accommodating the proposed 250MW injection at Fuller substation without overloading the SU system. There are therefore two possible scenarios:

(1) The Midway to Waterton line is in service before the injection begins.

There are no overloads identified on the Colorado Springs Utilities' system in the modified base case if the Midway to Waterton project is completed before the 250MW injection at Jackson Fuller substation begins. Colorado Springs Utilities believes that the 250 MW injection will not adversely impact the SU system in this scenario.

(2) The Midway to Waterton line is delayed until after the injection begins.

Without a completed Midway to Waterton line, there are significant overloads on four SU owned lines. Among the options available to the wind developer in this scenario would be to:

(a) Postpone generation until the line is completed.
(b) Limit generation to a level which mitigates overloads.
(c) Fund improvements to the SU lines as insurance against possible delays in the construction of the Midway to Waterton line.

Colorado Springs Utilities requires that mitigation of any overloads created on the SU system by the 250MW wind injection be made a condition of approval of the LGIA.

APPENDIX A

COMPARISON OF OVERLOADS AS REPORTED IN XCEL AND CSU STUDIES – MIDWAY TO WATERTON 345kV PROJECT ASSUMED IN SERVICE

			WORST CASE BRANCH N-1 LOADING WITHOUT GI-2007-12		WORST CASE BRANCH N-1 LOADING WITH GI-2007-12		
MONITORED BRANCH	**BRANCH RATING (MVA)**	**OWNER**	**Xcel STUDY**	**CSU STUDY**	**Xcel STUDY**	**CSU STUDY**	**WORST CASE CONTINGENCY**
73393 CTTNWD S/ 73389 BRIARGATE	159 (1)	CSU	109.8%	79%	124.1%	93.2%	73391 CTTNWD N/ 73410 KETTLECK
73391 CTTNWD N/ 73410 KETTLECK	168 (2)	CSU	111.3%	80.8%	126.9%	96%	73389 BRIARGAT/ 73393 CTTNWD S
73410 KETTLECK/ 73576 FLYHORSE	159	CSU	82.5%	73.2%	104%	82.2%	73460 BLK SQMV/ 73481 FULLER 115
73414 MONUMENT/ 73576 FLYHORSE	156 (3)	CSU	84.8%	68.6%	109%	87.1%	73460 BLK SQMV/ 73481 FULLER 115
73477 FULLER 230/ 73481 FULLER 115	100	TSG&T	92.1%	86.4%	114.6%	107.4%	73410 KETTLECK/ 73576 FLYHORSE

(1) This rating is 150 MVA in the Xcel study.
(2) This rating is 159 MVA in the Xcel study.
(3) This rating is 142 MVA in the Xcel study.

COMPARISON OF OVERLOADS AS REPORTED IN XCEL AND CSU STUDIES – MIDWAY TO WATERTON 345kV PROJECT NOT IN SERVICE

			WORST CASE BRANCH N-1 LOADING WITHOUT GI-2007-12		WORST CASE BRANCH N-1 LOADING WITH GI-2007-12		
MONITORED BRANCH	**BRANCH RATING (MVA)**	**OWNER**	**Xcel STUDY**	**CSU STUDY**	**Xcel STUDY**	**CSU STUDY**	**WORST CASE CONTINGENCY**
73393 CTTNWD S/ 73389 BRIARGATE	159 (1)	CSU	113.9%	92.5%	128.8%	110.3%	73391 CTTNWD N/ 73410 KETTLECK
73391 CTTNWD N/ 73410 KETTLECK	168 (2)	CSU	115.7%	95.1%	131.9%	114.2%	73389 BRIARGAT/ 73393 CTTNWD S
73410 KETTLECK/ 73576 FLYHORSE	159	CSU	88%	92%	110.3%	118.3%	73460 BLK SQMV/ 73481 FULLER 115
73414 MONUMENT/ 73576 FLYHORSE	156 (3)	CSU	91%	82.9%	116%	114.6%	73460 BLK SQMV/ 73481 FULLER 115
73477 FULLER 230/ 73481 FULLER 115	100	TSG&T	96%	98.2	119.1%	122.7%	73410 KETTLECK/ 73576 FLYHORSE

(1) This rating is 150 MVA in the Xcel study.
(2) This rating is 159 MVA in the Xcel study.
(3) This rating is 142 MVA in the Xcel study.

APPENDIX B

COMPARISON OF GENERATION DISPATCH IN Xcel AND CSU BASE CASES

GENERATOR	BUSS #	DISPATCH IN Xcel MODEL (MW)	DISPATCH IN CSU MODEL (MW)
BIRDSAL1	73381	12.8	0.0
BIRDSAL2	73382	12.8	0.0
BIRDSAL3	73383	20.2	0.0
RD_NIXON	73418	183.4	208
TESLA1	73424	22.5	28
DRAKE 5	73427	42.2	46
DRAKE 6	73428	69.7	77
DRAKE 7	73429	119.2	131
NIXONCT2	73434	27.5	0.0
NIXONCT1	73435	27.5	0.0
FTRNG1CC	73507	137.5	100
FTRNG2CC	73508	137.5	100
FTRNG3CC	73509	165	102.6
	TOTALS:	**977.8**	**792.6**

NOTE: SU meets load requirements with the local generation dispatched in the CSU model as shown above, supplemented by imports from WAPA and the City of Fountain's contracted supply from MEAN.

APPENDIX C

COMPARISON OF CSU LOADS IN Xcel AND CSU BASE CASES

BUSS #	NAME	KV	CSU LOAD IN Xcel MODEL (MW)	CSU LOAD IN CSU MODEL (MW)
73380	CLAREMNT	230	12.6	8.7
73385	BIRDSALN	34.5	37.8	48.7
73386	BIRDSALS	34.5	36.3	47.5
73387	BIRDSALW	115	22.8	19.5
73388	BRADLEY	115	60.4	60.8
73389	BRIARGAT	115	51.7	28.9
73391	CTTNWD N	115	26.8	20.7
73393	CTTNWD S	115	24.6	17.9
73395	CTTNWD S	34.5	2.8	26.4
73396	DRAKE E	34.5	34.8	53.8
73398	DRAKE S	115	19.0	26.8
73399	DRAKE W	34.5	61.5	28.1
73404	FOUNTAIN	115	52.4	54
73408	KELKER E	115	25.5	34.4
73409	KELKER W	115	23.6	19.3
73410	KETTLECK	115	38.5	26.2
73411	FONTERO	115	22.4	25.1
73417	RD_NIXON	115	3.4	1.9
73420	ROCKISLD	115	44.5	45.4
73421	STETSON	230	32.4	24.7
73423	TESLA	34.5	17.7	0.0
73425	WOODMEN	115	40.7	40.1
73430	FAIRVWCS	115	16.9	16.9
73490	RAMPART	115	45.4	40.7
73496	ATMELSUB	115	22.6	21.6
73564	KETTLECK	34.5	16.1	22.3
73565	KELKER	34.5	44.8	65.7
73566	ROCKISLD	34.5	70.93	57.4
73576	FLYHORSE	115	10.6	9.2
73601	SANTA FE	115	22.5	10.0
		TOTAL:	**942.03**	**902.7**

NOTE: Power factor of all loads is 97%