ARK Engineering Request of information to perform AC interference Study for Riverside pipeline load data

I am doing an AC interference study on the new Centerpoint Riverside 20" pipeline. In order to complete this study I need maximum load flows on all transmission lines that cross the pipeline route or parallel the route. I have plan and profile information on lines 0984 & 0992 Sherburne to Coon Creek, 0984 & 0980 from Coon Creek to Terminal/Kohlman Lake, and 0871 from Coon Creek to Riverside. I will need single phase to ground fault currents at each location (list below). We would like current contributions from each direction (nearest substation in each direction). I am also looking for maximum load current on each of these lines, as well as future load currents.

Answer:
Both lines 0984 and 0992 from Sherburne to Coon Creek are rated for 1195 MVA, 0980 from Coon Creek to Kohlman is rated for 1165, 0984 from Coon Creek to Terminal is rated for 1165, and 0871 from Coon Creek to Riverside is rated for 310 MVA, the limiting section being from Moore Lake to Riverside.

I was able to figure out the 115kv circuit 0871 which stops showing up on Centerpoint's alignment sheets (C4.46) as you go south (just south of Mississippi St NE) does show up again at the south end of the proposed pipeline. I believe it is the eastern-most overhead power line shown on Centerpoint's alingment sheet page C4.65 shown as a double OHP-C and turning into the riverside substation on page C4.66.

I still do not know anything about the other two sets of towers that leave riverside substation, (one heading north, and the other heading south). Please let me know if these are Xcel's lines or someone else's. If they are yours, I will need all the same power data you are providing for the other lines.

I have also made a list of towers where I will need fault data for single phase to ground faults.

0984	tower 189
0992	tower 189
0984	tower 195
0992	tower 195
0984	tower 208
0992	tower 208
0984	coon creek substation
0992	coon creek substation
0980	coon creek substation
0871	coon creek substation
0980	tower 164
0984	tower 164
0871	tower 98
0871	tower 97
0871	tower 74
0871	riverside substation

Answer:

Riverside Line 871

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 SINGLE_LINE_GROUND at bus "45928 RIV_#2_115"
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 Substation RIVERSIDE (XCEL)                        Area  23 NSP              Zone  23
NSP
 Bus  45928 RIV_#2_115    CO                Base kV  115.00 Ph-Ph (   66.40 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                               + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 45.3221 @  -0.5   21.0879 @ 179.9   24.2350 @ 179.2  | 0.00000 @
0.0   67.8007 @-122.8   68.2748 @ 121.8

 Thevenin (R, X)(p.u.)> 0.00085,0.01027   0.00107,0.01025   0.00138,0.01177
 Thevenin (R, X)(Ohms)> 0.11297,1.35815   0.14209,1.35600   0.18222,1.55627

 Fault Currents (Amps)> 15466.9 @ -84.2   15466.9 @ -84.2   46400.6 @ -84.2  | 46400.6 @
-84.2   0.00000 @   0.0   0.00000 @   0.0
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Coon Creek Line 871

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================================================================================================================
 SINGLE_LINE_GROUND at bus "45718 CNC_#2_115KV"
 ---------------------------------------------------------------------------------------------------------------
 Substation COON CREEK (XCEL)                       Area  23 NSP              Zone  23
NSP
 Bus  45718 CNC_#2_115KV  CO                Base kV  115.00 Ph-Ph (   66.40 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                               + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 45.0772 @  -0.6   21.3002 @-179.4   23.7860 @ 178.3  | 0.00000 @
0.0   66.8715 @-122.4   68.4287 @ 121.2

 Thevenin (R, X)(p.u.)> 0.00068,0.00985   0.00079,0.00983   0.00132,0.01094
 Thevenin (R, X)(Ohms)> 0.09031,1.30301   0.10426,1.30042   0.17444,1.44635

 Fault Currents (Amps)> 16327.2 @ -84.8   16327.2 @ -84.8   48981.5 @ -84.8  | 48981.5 @
-84.8   0.00000 @   0.0   0.00000 @   0.0
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Tower 98 Line 871

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================================================================================================================
 Midline node on "45928 RIV_#2_115"  to  "45879 MOL_115KV_#3" Ckt 1
 "999001 RIV_#2_115" (NEWBUS1) distant 0.190 from "45928 RIV_#2_115"
 SINGLE_LINE_GROUND at temporary bus "999001 RIV_#2_115" (NEWBUS1)
 ---------------------------------------------------------------------------------------------------------------
 Substation RIVERSIDE (XCEL)                        Area  23 NSP              Zone  23
NSP
 Bus 999001 RIV_#2_115    FI                Base kV  115.00 Ph-Ph (   66.40 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                               + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 48.6961 @  -1.1   17.7396 @-177.8   31.0022 @ 177.0  | 0.00000 @
0.0   72.2064 @-130.2   75.6813 @ 127.7

 Thevenin (R, X)(p.u.)> 0.00167,0.01550   0.00188,0.01548   0.00570,0.02666
 Thevenin (R, X)(Ohms)> 0.22147,2.04994   0.24802,2.04789   0.75348,3.52548

 Fault Currents (Amps)> 8599.55 @ -80.9   8599.55 @ -80.9   25798.7 @ -80.9  | 25798.7 @
-80.9   0.00000 @   0.0   0.00000 @   0.0
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Tower 97 Line 871

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 Midline node on "45928 RIV_#2_115"  to  "45879 MOL_115KV_#3" Ckt 1
 "999001 RIV_#2_115" (NEWBUS1) distant 0.204 from "45928 RIV_#2_115"
 SINGLE_LINE_GROUND at temporary bus "999001 RIV_#2_115" (NEWBUS1)
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 Substation RIVERSIDE (XCEL)                       Area  23 NSP             Zone  23
NSP
 Bus 999001 RIV_#2_115    FI               Base kV  115.00 Ph-Ph (   66.40 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                               + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 48.8505 @  -1.1   17.5859 @-177.7   31.3121 @ 177.0  | 0.00000 @
0.0   72.4681 @-130.5   76.0041 @ 127.9

 Thevenin (R, X)(p.u.)> 0.00172,0.01583   0.00192,0.01581   0.00599,0.02773
 Thevenin (R, X)(Ohms)> 0.22801,2.09357   0.25438,2.09152   0.79267,3.66673

 Fault Currents (Amps)> 8346.70 @ -80.8   8346.70 @ -80.8   25040.1 @ -80.8  | 25040.1 @
-80.8   0.00000 @   0.0   0.00000 @   0.0
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Tower 74 Line 871

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 Midline node on "45928 RIV_#2_115"  to  "45879 MOL_115KV_#3" Ckt 1
 "999001 RIV_#2_115" (NEWBUS1) distant 0.420 from "45928 RIV_#2_115"
 SINGLE_LINE_GROUND at temporary bus "999001 RIV_#2_115" (NEWBUS1)
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 Substation RIVERSIDE (XCEL)                       Area  23 NSP             Zone  23
NSP
 Bus 999001 RIV_#2_115    FI               Base kV  115.00 Ph-Ph (   66.40 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                               + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 50.0895 @  -1.1   16.3505 @-177.1   33.8004 @ 176.9  | 0.00000 @
0.0   74.6701 @-132.8   78.6171 @ 130.0

 Thevenin (R, X)(p.u.)> 0.00230,0.01995   0.00248,0.01994   0.00943,0.04045
 Thevenin (R, X)(Ohms)> 0.30382,2.63873   0.32753,2.63674   1.24752,5.34912

 Fault Currents (Amps)> 6153.72 @ -80.0   6153.72 @ -80.0   18461.2 @ -80.0  | 18461.2 @
-80.0   0.00000 @   0.0   0.00000 @   0.0
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Coon Creek Sub. Line 984/992

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 SINGLE_LINE_GROUND at bus "45719 CNC_#2_345KV"
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 Substation COON CREEK (XCEL)                      Area  23 NSP             Zone  23
NSP
 Bus  45719 CNC_#2_345KV  CO               Base kV  345.00 Ph-Ph (  199.19 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                               + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 140.960 @  -1.2   58.1338 @-178.2   82.9606 @ 176.7  | 0.00000 @
0.0   207.320 @-127.1   217.748 @ 124.5

 Thevenin (R, X)(p.u.)> 0.00043,0.00571   0.00053,0.00568   0.00147,0.00801
 Thevenin (R, X)(Ohms)> 0.51545,6.79224   0.63088,6.76010   1.74995,9.52966

 Fault Currents (Amps)> 8562.34 @ -82.8   8562.34 @ -82.8   25687.0 @ -82.8  | 25687.0 @
-82.8   0.00000 @   0.0   0.00000 @   0.0
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Tower 208 Line 984/992

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 Midline node on "45719 CNC_#2_345KV"  to  "45948 SHC_#2_345" Ckt 984
 "999001 CNC_#2_345KV" (NEWBUS1) distant 0.035 from "45719 CNC_#2_345KV"
 SINGLE_LINE_GROUND at temporary bus "999001 CNC_#2_345KV" (NEWBUS1)
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-----------------------------------------
 Substation COON CREEK (XCEL)                      Area  23 NSP             Zone  23
NSP
 Bus 999001 CNC_#2_345KV  FI               Base kV  345.00 Ph-Ph (  199.19 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                           + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 142.899 @  -1.3   56.2556 @-177.6   86.8324 @ 176.3  | 0.00000 @
0.0   209.815 @-128.6   222.153 @ 125.6

 Thevenin (R, X)(p.u.)> 0.00048,0.00628   0.00058,0.00625   0.00190,0.00950
 Thevenin (R, X)(Ohms)> 0.57197,7.47363   0.68994,7.44232   2.26509,11.3122

 Fault Currents (Amps)> 7526.61 @ -82.3   7526.61 @ -82.3   22579.8 @ -82.3  | 22579.8 @
-82.3   0.00000 @   0.0   0.00000 @   0.0
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Tower 195 Line 984/992

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 Midline node on "45719 CNC_#2_345KV"  to  "45948 SHC_#2_345" Ckt 984
 "999001 CNC_#2_345KV" (NEWBUS1) distant 0.115 from "45719 CNC_#2_345KV"
 SINGLE_LINE_GROUND at temporary bus "999001 CNC_#2_345KV" (NEWBUS1)
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 Substation COON CREEK (XCEL)                      Area  23 NSP             Zone  23
NSP
 Bus 999001 CNC_#2_345KV  FI               Base kV  345.00 Ph-Ph (  199.19 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                           + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 145.175 @  -1.4   54.0511 @-177.1   91.3637 @ 176.1  | 0.00000 @
0.0   213.248 @-130.1   227.066 @ 126.8

 Thevenin (R, X)(p.u.)> 0.00057,0.00742   0.00068,0.00740   0.00262,0.01228
 Thevenin (R, X)(Ohms)> 0.68398,8.83728   0.80806,8.80780   3.12133,14.6211

 Fault Currents (Amps)> 6111.07 @ -81.9   6111.07 @ -81.9   18333.2 @ -81.9  | 18333.2 @
-81.9   0.00000 @   0.0   0.00000 @   0.0
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Tower 189 Line 984/992

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 Midline node on "45719 CNC_#2_345KV"  to  "45948 SHC_#2_345" Ckt 984
 "999001 CNC_#2_345KV" (NEWBUS1) distant 0.153 from "45719 CNC_#2_345KV"
 SINGLE_LINE_GROUND at temporary bus "999001 CNC_#2_345KV" (NEWBUS1)
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 Substation COON CREEK (XCEL)                      Area  23 NSP             Zone  23
NSP
 Bus 999001 CNC_#2_345KV  FI               Base kV  345.00 Ph-Ph (  199.19 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                           + seq             - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 145.624 @  -1.4   53.6150 @-177.1   92.2483 @ 176.1  | 0.00000 @
0.0   214.103 @-130.4   227.886 @ 127.1

 Thevenin (R, X)(p.u.)> 0.00061,0.00789   0.00072,0.00787   0.00283,0.01329
 Thevenin (R, X)(Ohms)> 0.72881,9.39055   0.85595,9.36191   3.37148,15.8197
 Fault Currents (Amps)> 5703.14 @ -81.8   5703.14 @ -81.8   17109.4 @ -81.8  | 17109.4 @
-81.8   0.00000 @   0.0   0.00000 @   0.0
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Coon Creek Sub Line 980

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 SINGLE_LINE_GROUND at bus "1709 CNC_#1_345KV"
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-----------------------------------------
 Substation COON CREEK (XCEL)                        Area  23 NSP              Zone  23
NSP
 Bus   1709 CNC_#1_345KV  CO                Base kV  345.00 Ph-Ph (  199.19 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                           + seq              - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 140.960 @  -1.2   58.1338 @-178.2   82.9606 @ 176.7  | 0.00000 @
0.0   207.320 @-127.1   217.748 @ 124.5

 Thevenin (R, X)(p.u.)> 0.00043,0.00571   0.00053,0.00568   0.00147,0.00801
 Thevenin (R, X)(Ohms)> 0.51545,6.79224   0.63088,6.76010   1.74995,9.52966

 Fault Currents (Amps)> 8562.34 @ -82.8   8562.34 @ -82.8   25687.0 @ -82.8  | 25687.0 @
-82.8   0.00000 @   0.0   0.00000 @   0.0
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Tower 164 Line 980/984

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 Midline node on "45719 CNC_#2_345KV"  to  "45948 SHC_#2_345" Ckt 984
 "999001 CNC_#2_345KV" (NEWBUS1) distant 0.153 from "45719 CNC_#2_345KV"
 Midline node on "1709 CNC_#1_345KV"  to  "45979 TER_345KV_2" Ckt 1
 "999002 CNC_#1_345KV" (NEWBUS2) distant 0.003 from "1709 CNC_#1_345KV"
 SINGLE_LINE_GROUND at temporary bus "999002 CNC_#1_345KV" (NEWBUS2)
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 Substation COON CREEK (XCEL)                        Area  23 NSP              Zone  23
NSP
 Bus 999002 CNC_#1_345KV  FI                Base kV  345.00 Ph-Ph (  199.19 @0 deg A-Gnd)
Prefault 1.000 V (p.u.)   @    0.00
                           + seq              - seq         0 seq / 3Io            A
phase           B phase           C phase
 Voltage (kV) Ph-Gnd  > 141.012 @  -1.2   58.0829 @-178.2   83.0652 @ 176.7  | 0.00000 @
0.0   207.379 @-127.2   217.871 @ 124.5

 Thevenin (R, X)(p.u.)> 0.00043,0.00572   0.00053,0.00569   0.00148,0.00804
 Thevenin (R, X)(Ohms)> 0.51725,6.80804   0.63262,6.77586   1.76340,9.57131

 Fault Currents (Amps)> 8534.92 @ -82.8   8534.92 @ -82.8   25604.7 @ -82.8  | 25604.7 @
-82.8   0.00000 @   0.0   0.00000 @   0.0
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