

Date: ~~August~~ , 2008
Sept. 8

PROJECT NOTIFICATION

JOB TITLE: Belleville 17th St Sub: Install 2nd 138/34.5 KV Transformer

LOCATION: Belleville 17th St Sub

IN SERVICE DATE: 6/1/2010

NOTIFICATION: Original

COMPANY: AmerenIP **DIVISION:** VI

DP#: 2213 **SACF =** 12.86

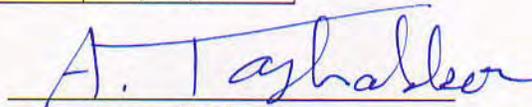
DESCRIPTION & SCOPE: Install a 138/34.5 KV, 112 MVA transformer with LTC, with a low-side breaker, a N.O. bus tie breaker, and all associated relaying and protective equipment.

JUSTIFICATION: The need for the transformer was identified in the Belleville Subtransmission Study dated October, 2005. The need has also been confirmed by Transmission Planning. The existing 17th St trf #4 is projected to be loaded to 97.3% in 2009 during normal system conditions and will be loaded to 103.9% of the Normal rating (110.6 MVA) by 2013. In 2009, this transformer will be overloaded under several contingencies, the worst being a 114% of the emergency rating (128 MVA) with an outage of L1472; and a 101% of the Emergency rating (114% the Normal rating) with an outage of the S. Belleville Trf #1.

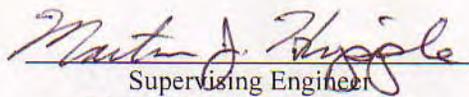
ESTIMATED COST:

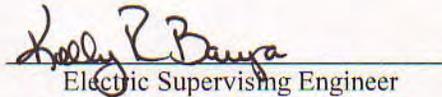
| | CBS Project W.O. # | Estimated Cost |
|------------|-----------------------|----------------|
| Substation | | \$ 4,204,000 |
| Line | | \$ |
| Total | | \$ 4,204,000 |

SUBMITTED BY:


Engineer
Distribution System Planning

APPROVED BY:


Supervising Engineer
Distribution System Planning


Electric Supervising Engineer
Energy Delivery IL Division VI

- | | | | |
|----------------|----------------|-----------------|--------------------|
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PROJECT NOTIFICATION
Belleville 17th St Sub: Install 2nd 138/34.5 KV Transformer

DETAILS:

1. Attached is a simplified one-line showing the proposed work in solid red line. The project involves adding a 138/34.5 KV transformer with low-side breaker, and splitting the 34.5 KV bus with a normally open bus tie breaker.
2. Attached is also a one-line showing the substation's ultimate configuration. The ultimate plan is to bring another 138 KV line into the substation and build a 138 KV ring bus to provide independent sources to the transformers. No timetable has been set for this plan.
3. 138 KV Circuit Switchers are planned for the protection of the transformers at this time. The 138 KV bus should be designed and necessary switches installed to facilitate the future installation of the ring bus when requested by Transmission Planning.

SPECIFICATIONS:

Substation-General

1. Ultimate 3 ϕ symmetrical bus fault levels:
138 kV - 25 kA
34.5 kV – 31 kA
2. Transformer Positions:
138 kV – conductor and equipment
summer continuous / emergency – 600 / 750 Amps

34.5 kV – conductor and equipment
summer continuous / emergency – 2200 / 2800 Amps
3. 138 kV Bus:
Ameren standard 3000 amp summer continuous.
Ultimate configuration is a ring bus with 2 lines and 2 transformers.
4. Relaying as specified by EDTS System Protection.
5. Metering in accordance with Ameren bulk substation standards.
6. Supervisory indication and control as required by Illinois Distribution Operations.

Transformer

1. Ameren standard 67.2/89.6/112 MVA (65⁰C rise), 138-34.5 kV Delta-Wye with LTC.
2. High-side no-load taps: 132.0 kV, 135.6 kV, 139.2 kV, 142.8 kV, 146.4 kV (suggested in-service tap – 135.6 kV).
3. \pm 10% LTC on the 34.5 kV winding.
4. Impedance to be approximately 10 -15 % (100 MVA base)
5. Protection to be specified by System Protection.
6. Transformer load and temperature profile per table below.
7. Capitalized equivalent of transformer losses:
\$ 4000/kW Fe no-load losses
\$ 1100/kW Cu load losses @ OA rating

34.5 kV Circuit Breakers

1. Transformer #6 low-side breaker and bus tie breaker to match or exceed a 112 MVA transformer thermal rating:
Summer normal - (2200 Amps)
Summer emergency - (2800 Amps)
Minimum interrupting capability of 30 kA

Belleville 17th St Sub Transformer #6
24 Hour Load Duration Data
 138/34.5 kV 112 MVA top rated

| Hour | Ambient Temperature | Long-term Emergency MVA | Four-hour Emergency MVA |
|------|---------------------|-------------------------|-------------------------|
| 1 | 88 | 83 | 66 |
| 2 | 87 | 81 | 64 |
| 3 | 85 | 79 | 63 |
| 4 | 83 | 78 | 62 |
| 5 | 82 | 78 | 62 |
| 6 | 83 | 81 | 64 |
| 7 | 85 | 90 | 72 |
| 8 | 86 | 103 | 82 |
| 9 | 89 | 112 | 89 |
| 10 | 91 | 122 | 97 |
| 11 | 94 | 129 | 102 |
| 12 | 97 | 133 | 151 |
| 13 | 99 | 135 | 153 |
| 14 | 102 | 137 | 154 |
| 15 | 103 | 135 | 153 |
| 16 | 104 | 134 | 134 |
| 17 | 103 | 133 | 133 |
| 18 | 102 | 129 | 129 |
| 19 | 100 | 124 | 124 |
| 20 | 98 | 124 | 124 |
| 21 | 95 | 119 | 119 |
| 22 | 92 | 109 | 109 |
| 23 | 90 | 98 | 98 |
| 24 | 90 | 89 | 89 |

SPECIAL CONSIDERATIONS:

1. Breakers for lines 3368 and 3369 will be replaced in 2009 due to condition (DP# 2215; ISP# D73028).
2. Belleville 17th St Substation is currently served radially from Line 1586A from South Belleville (the 138 KV Switch #1497 is N.O. at Centerville 138 KV sub). There is a plan to replace this switch with a N.C. breaker in 2011 (TP-420) and reconductor parts of Line 1586. This will tie Line 1492A from Cahokia Substation to Line 1586 from South Belleville.
3. There is no load on the 34.5/4.16 KV distribution Transformer #2. This transformer is a back up to Transformer #1. In the future Trf #2 may be removed if space becomes an issue.
4. The 34.5/4.16 KV distribution Transformer #1 serves only one feeder (2.2 MW) and is a back up for Transformer #3. In the future Transformer #1 could be replaced due to condition, or potentially removed if Transformer #3 is upgraded (some feeder work may be necessary).

Prepared by: Adib Tashakkor

