

**SEPTA  
TRACTION POWER SUBSTATION  
REHABILITATION  
CONTRACT 4  
MARKET - RANSTEAD - ELLEN**

**PECO 13.2 kV SERVICE FAULT DUTY**

**E-Mail Transmittal**  
**Distribution Standards & Customer Engineering**  
1050 W. Swedesford Road  
Berwyn, PA 19312

**August 15, 2016**

Mr. Robert J. Verhelle  
Senior Director / Associate Vice President  
NED Rail Department  
HNTB CORPORATION  
680 American Avenue, Suite 100  
King of Prussia, PA 19406  
Email: [rverhelle@hntb.com](mailto:rverhelle@hntb.com)

4600 TPSS LOCATION IS ONE  
TPSS WEST OF MARKET  
& 33RD STREETS TPSS

**Subject: SEPTA Substation at 4600 Market Street – Available Fault Current and Upstream Over-Current Device Settings**

Dear Bob:

The following 13.2 KV fault current information is provided to assist in the study for SEPTA at their 4600 Market Street in Philadelphia Substation (T-1670). The maximum fault current from either 13.2 kV circuit is 6,300 Amps, symmetrical at the head of each circuit and the minimum is estimated at 1,200 Amps, symmetrical at the end of each circuit. An estimation of the actual available fault currents at the service delivery points are as follows:

	<b>Parrish-140</b>	<b>University-131</b>
<b>3 Phase Amps – 100 MVA, 13.8 kV Base</b>	<b>3,979 Symmetrical Amps X/R = 4.7</b>	<b>4,548 Symmetrical Amps X/R = 10.3</b>
<b>1 Phase Amps – 100 MVA, 13.8 kV Base</b>	<b>3,257 Symmetrical Amps X/R = 3.4</b>	<b>4,392 Symmetrical Amps X/R = 8.1</b>

The estimated values of fault current may change at any time, without notice to the customer. The value may range from the guaranteed maximum of 6,300 symmetrical to the estimated minimum of 1,200 symmetrical.

The customer's service entrance over-current protection settings are as follows:

**Phase Settings:**

Relay – ABB 51Y

Curve – Inverse

CT Ratio – 120/1

Phase Setting – 5.0 A (Secondary); 600 A (Primary); Delay (Time Dial = 2.0)

Instantaneous – 25 x Phase Tap Setting = 125 A (Secondary); 15,000 A (Primary)

**Ground Relay**

Relay – ABB 51Y

Curve – Inverse

CT Ratio – 120/1

Phase Setting – 1.5 A (Secondary); 180 A (Primary); Delay (Time Dial = 1.0)

Instantaneous – 3 x Ground Tap Setting = 4.5 A (Secondary); 540 A (Primary)

Mr. Robert J. Verhelle - HNTB CORPORATION  
SEPTA Substation at 4600 Market Street - Available Fault Current and Upstream Over-Current  
Device Settings

August 15, 2016 page 2

The PECO upstream over-current protection settings associated with Parrish-140 and University-  
131 services are as follows:

**PECO Parrish-140 Relay**

Relay – Schweitzer SEL-251-D

Curve – U3 (Very Inverse)

CT Ratio – 120/1

Phase Setting – 5.0 A (Secondary); 600 A (Primary); Time Dial – 3.28

Ground Setting – 5.0 A (Secondary); 600 A (Primary); Time Dial – 3.28

No Instantaneous on Phase or Ground

**PECO University-131 Relay**

Relay – GE IAC-53

Curve – Very Inverse

CT Ratio – 120/1

Phase Setting – 5.0 A (Secondary); 600 A (Primary); Time Delay – 70 Cycles @ 400% of Pickup

Ground Setting – 5.0 A (Secondary); 600 A (Primary); Time Delay – 70 Cycles @ 400% of Pickup

No Instantaneous on Phase or Ground

Our comments do not relieve the designer of the responsibility for an adequate design. The  
designer has the responsibility that the installation is in accordance with the National Electrical  
Code, the National Electrical Safety Code and other codes that apply. The design shall also meet  
requirements listed in PECO's *Electric Service Requirements* handbook. A link to this document  
is attached here for your convenience.

<https://www.peco.com/PartnersinBusiness/BuildersandContractors/Pages/Guidelines.aspx>

If you have any questions concerning these comments, please contact me on (610) 725–7174.

Sincerely,

Chuck Boeggeman  
Senior Engineer  
PECO Energy (An Exelon Company)  
Distribution Standards  
1050 West Swedesford Road  
Berwyn, PA 19312  
charles.boeggeman@exeloncorp.com

CJB/

Available Fault Current and PECO Upstream Over-Current Protection Settings (T-1670).doc-64

cc: M. P. Keller – Manager, Distribution Standards & Customer Engineering  
P. M. Kirlin – Senior Account Executive, LCS

**E-Mail Transmittal**  
**Distribution Standards & Customer Engineering**  
1050 W. Swedesford Road  
Berwyn, PA 19312

**August 15, 2016**

Mr. Robert J. Verhelle  
Senior Director / Associate Vice President  
NED Rail Department  
HNTB CORPORATION  
680 American Avenue, Suite 100  
King of Prussia, PA 19406  
Email: [rverhelle@hntb.com](mailto:rverhelle@hntb.com)

**Subject: SEPTA Substation at 2075 Ranstead Street – Available Fault Current and Upstream Over-Current Device Settings**

Dear Bob:

The following 13.2 KV fault current information is provided to assist in the study for SEPTA at their 2075 Ranstead Street, Philadelphia Substation (T-8346). The maximum fault current from either 13.2 kV circuit is 6,300 Amps, symmetrical at the head of each circuit and the minimum is estimated at 1,200 Amps, symmetrical at the end of each circuit. An estimation of the actual available fault currents at the service delivery points are as follows:

	Line 2471 Grays Ferry Substation	Line 2477 Grays Ferry Substation
<b>3 Phase Amps – 100 MVA, 13.8 kV Base</b>	<b>3,838 Symmetrical Amps X/R = 3.0</b>	<b>4,472 Symmetrical Amps X/R = 4.6</b>
<b>1 Phase Amps – 100 MVA, 13.8 kV Base</b>	<b>3,283 Symmetrical Amps X/R = 2.3</b>	<b>4,059 Symmetrical Amps X/R = 3.5</b>

The estimated values of fault current may change at any time, without notice to the customer. The value may range from the guaranteed maximum of 6,300 symmetrical to the estimated minimum of 1,200 symmetrical.

The customer's service entrance over-current protection settings are as follows:

**Phase Settings:**

Relay – ABB 51Y

Curve – Inverse

CT Ratio – 200/1

Phase Setting – 2.5 A (Secondary); 500 A (Primary); Delay (20 Cycles @ 400% of Pickup)

Instantaneous – 20 x 2.5 = 50 A (Secondary); 10,000 A (Primary)

**Ground Relay**

Relay – ABB 51Y

Curve – Inverse

CT Ratio – 200/1

Phase Setting – 1.0 A (Secondary); 200 A (Primary); Delay (15 Cycles @ 400% of Pickup)

Instantaneous – 5 x 1.0 = 5.0 A (Secondary); 1,000 A (Primary)

Mr. Robert J. Verhelle - HNTB CORPORATION  
SEPTA Substation at 2075 Ranstead Street - Available Fault Current and Upstream Over-Current  
Device Settings

August 15, 2016 page 2

The PECO upstream over-current protection settings associated with Line 2471 and Line 2477  
services are as follows:

**PECO Line 2471 Relay**

Relay – Schweitzer SEL-251D  
Curve – U3 (Very Inverse)  
CT Ratio – 120/1  
Phase Setting – 5.0 A (Secondary); 600 A (Primary); Time Dial – 3.28  
Ground Setting – 5.0 A (Secondary); 600 A (Primary); Time Dial – 3.28  
No Instantaneous on Phase or Ground

**PECO Line 2477 Relay**

Relay – Schweitzer SEL-251D  
Curve – U3 (Very Inverse)  
CT Ratio – 120/1  
Phase Setting – 5.0 A (Secondary); 600 A (Primary); Time Dial – 3.28  
Ground Setting – 5.0 A (Secondary); 600 A (Primary); Time Dial – 3.28  
No Instantaneous on Phase or Ground

Our comments do not relieve the designer of the responsibility for an adequate design. The  
designer has the responsibility that the installation is in accordance with the National Electrical  
Code, the National Electrical Safety Code and other codes that apply. The design shall also meet  
requirements listed in PECO's *Electric Service Requirements* handbook. A link to this document  
is attached here for your convenience.

<https://www.peco.com/PartnersinBusiness/BuildersandContractors/Pages/Guidelines.aspx>

If you have any questions concerning these comments, please contact me on (610) 725–7174.

Sincerely,

Chuck Boeggeman  
Senior Engineer  
PECO Energy (An Exelon Company)  
Distribution Standards  
1050 West Swedesford Road  
Berwyn, PA 19312  
charles.boeggeman@exeloncorp.com

CJB/

Available Fault Current and PECO Upstream Over-Current Protection Settings (T-8346).doc-29

cc: M. P. Keller – Manager, Distribution Standards & Customer Engineering  
P. M. Kirlin – Senior Account Executive, LCS

September 6, 2016

Mr Robert Verhelle  
 HNTB Corporation  
 2 West Lafayette St  
 Suite 280  
 Norristown Pa 19401

Subject: SEPTA Ellen Sub  
 13.2 KV Service Fault Duty

Dear Mr Robert Verhelle:

As requested in your e-mail dated 8/10/2016, the following 13.2 KV fault current information is provided to assist in your electrical system studies for SEPTA Ellen Sub, 946 N Front St, Philadelphia. The maximum fault current from either PECO-Energy's circuit is **6,300** Amps, symmetrical (X/R=26) and the minimum is estimated at 1,200 Amps, symmetrical (X/R=2). An estimation of the actual fault currents at the customer's 13.2 KV service substation, at this time is:

	TUNA-132	TUNA-144
<b>3 PHASE Amps @ 13.8 KV</b>	4,604 Sym Amps X/R = 7.3	4,750 Sym Amps X/R = 7.4
<b>1 PHASE Amps @ 13.8 KV</b>	4,292 Sym Amps X/R = 5.5	4,519 Sym Amps X/R = 5.6
<b>Circuit Length</b>	5,318 Ft	5,118 Ft

**The estimated values of fault current may change at any time, without notice to the customer. The value may range from the guaranteed maximum to the estimated minimum.**

This customer receives 13,200 Volt service and owns, operates, and maintains all of the 13,200 Volt service equipment and transformers. You should verify service switch, fuse, circuit breaker, and transformer ratings with the customer.

PECO's records indicate that the customer has a service circuit breaker with relays set as follows:

<b>RELAY SETINGS</b>
1 – Westinghouse CO-8 PHASE OVERCURRENT RELAYS, 1 – 12 Time <u>6 – 144 INSTANTANEOUS – MODEL #CO-8H1111N Curve – Inverse</u> 720 A PRI – 600/5 CT – 6 A TAP – Time 55 CYCLES @ 400% DELAY Instantaneous Inoperative
1 – Westinghouse CO-2 OVERCURRENT GROUND RELAY, 0.5 – 2.5 Time <u>4 – 16 INSTANTANEOUS – MODEL #1875225 Curve –</u> 120 A PRI – 600/5 CT – 1 A TAP – Time 15 CYCLES @ 400% DELAY Instantaneous Inoperative
3 -Westinghouse CR-8 DIRECTIONAL PHASE OVERCURRENT RELAYS, 2-6 Time <u>MODEL #1875225 Curve –</u> 240 A PRI – 600/5 CT – 2 A TAP – Time 15 CYCLES @ 400% DELAY

Mr Robert Verhelle  
SEPTA Ellen Sub  
September 6, 2016 page 2

The next available upstream overcurrent devices from the customer service relays are:PECO's Line overcurrent relays, which are as follows:

- **TUNA-132 – SEL 351**
  - Phase Elements - Curve #3 Very Inverse
    - 600 Amp primary pick-up Time Dial = 3.28
    - No Instantaneous
  - Ground Element - Curve #3 Very Inverse
    - 600 Amp primary pick-up Time Dial = 3.28
    - No Instantaneous

**TUNA-144 – SEL-351**

- Phase Elements - Curve #3 Very Inverse
  - 840 Amp primary pick-up Time Dial = 2.82
  - No Instantaneous
- Ground Element - Curve #3 Very Inverse
  - 420 Amp primary pick-up Time Dial = 3.0
  - No Instantaneous

Our comments do not relieve the designer of the responsibility for an adequate design. He has the responsibility that the installation is in accordance with the National Electrical Code, the National Electrical Safety Code and other codes which apply.

If you have any questions concerning these comments, please contact me on (215) 956 - 3357.

Sincerely,

Barry N. Hornberger  
Distribution Standards  
Customer Engineering  
400 Park Ave  
Warminster, PA 18974

bnh/FAULT T-8302 SEPTA Ellen Sub 2016=0321.doc-15

cc: P.M. Kirlin  
M.P. Keller

**SEPTA  
TRACTION POWER SUBSTATION  
REHABILITATION  
CONTRACT 5  
BROAD - PARK - LOUDON - CASTOR**

**PECO 13.2 kV SERVICE FAULT DUTY**

August 30, 2016

Mr Robert Verhelle  
 HNTB Corporation  
 2 West Lafayette St  
 Suite 280  
 Norristown Pa 19401

Subject: SEPTA - Mt Vernon Sub  
 13.2 KV Service Fault Duty

Dear Mr Robert Verhelle:

As requested in your e-mail dated 8/10/2016, the following 13.2 KV fault current information is provided to assist in your electrical system studies for SEPTA - Mt Vernon Sub, 1245 Mt Vernon St, Philadelphia. The maximum fault current from either PECO-Energy's circuit is **6,300** Amps, symmetrical (X/R=26) and the minimum is estimated at 1,200 Amps, symmetrical (X/R=2). An estimation of the actual fault currents at the customer's 13.2 KV service substation, at this time is:

	TUNA LINE-532	TUNA LINE-540
<b>3 PHASE Amps @ 13.8 KV</b>	3,923 Sym Amps X/R = 3.4	4,121 Sym Amps X/R = 3.9
<b>1 PHASE Amps @ 13.8 KV</b>	3,438 Sym Amps X/R = 2.6	3.682 Sym Amps X/R = 3.0
<b>Circuit Length</b>	15,169 Ft	12,594 Ft

**The estimated values of fault current may change at any time, without notice to the customer. The value may range from the guaranteed maximum to the estimated minimum.**

This customer receives 13,200 Volt service and owns, operates, and maintains all of the 13,200 Volt service equipment and transformers. You should verify service switch, fuse, circuit breaker, and transformer ratings with the customer.

PECO's records indicate that the customer has a service circuit breaker with relays set as follows:

<b>RELAY SETTNCS</b>
3 - ABB MicroShield 51 PHASE OVERCURRENT RELAYS, 4 - 12 Time <u>2 - 20 INSTANTANEOUS - MODEL #443S2341 Curve - VERY INVERSE</u> 480 A PRI - 300/5 CT - 8 A TAP - Time 64 CYCLES @ 400% DELAY (TD ≈ 3) 1,400 A PRI - 300/5 CT - 3 X TD PU or 24 x CT Ratio Instantaneous
1 - ABB MicroShield 51 GROUND OVERCURRENT RELAY, 1.5 - 6 Time <u>2 - 20 INSTANTANEOUS - MODEL #443S2341 Curve - VERY INVERSE</u> 90 A PRI - 300/5 CT - 1.5 A TAP - Time 16 CYCLES @ 400% DELAY (TD ≈ 1) 180 A PRI - 300/5 CT - 2 X TD PU or 3 x CT Ratio Instantaneous

Mr Robert Verhelle  
SEPTA - Mt Vernon Sub  
August 30, 2016 page 2

The next available upstream overcurrent devices from the customer service fuse are:PECO's Line overcurrent relays, which are as follows:

**TUNA LINE-532 – SEL-351**

- Phase Elements - Curve #3 Very Inverse
  - 960 Amp primary pick-up Time Dial = 3,28
  - No Instantaneous
- Ground Element - Curve #3 Very Inverse
  - 840 Amp primary pick-up Time Dial = 3.76
  - No Instantaneous

**TUNA LINE-532 – SEL-351**

- Phase Elements - Curve #3 Very Inverse
  - 840 Amp primary pick-up Time Dial = 3,28
  - No Instantaneous
- Ground Element - Curve #3 Very Inverse
  - 720 Amp primary pick-up Time Dial = 3.28
  - No Instantaneous

Our comments do not relieve the designer of the responsibility for an adequate design. He has the responsibility that the installation is in accordance with the National Electrical Code, the National Electrical Safety Code and other codes which apply.

If you have any questions concerning these comments, please contact me on (215) 956 - 3357.

Sincerely,

Barry N. Hornberger  
Distribution Standards  
Customer Engineering  
400 Park Ave  
Warminster, PA 18974

bnh/FAULT T-8324 SEPTA Mt Vernon Sub 2016=0318.doc-45

cc: P.M. Kirlin  
M.P. Keller

**E-Mail Transmittal**  
**Distribution Standards & Customer Engineering**  
1050 W. Swedesford Road  
Berwyn, PA 19312

**August 15, 2016**

Mr. Robert J. Verhelle  
Senior Director / Associate Vice President  
NED Rail Department  
HNTB CORPORATION  
680 American Avenue, Suite 100  
King of Prussia, PA 19406  
Email: [rverhelle@hntb.com](mailto:rverhelle@hntb.com)

**Subject: SEPTA Substation at 2440 N. Park Avenue – Available Fault Current and Upstream Over-Current Device Settings**

Dear Bob:

The following 13.2 KV fault current information is provided to assist in the study for SEPTA at their 2440 N. Park Avenue, Philadelphia Substation (T-8329). The maximum fault current from either 13.2 kV circuit is 6,300 Amps, symmetrical at the head of each circuit and the minimum is estimated at 1,200 Amps, symmetrical at the end of each circuit. An estimation of the actual available fault currents at the service delivery points are as follows:

	<b>Line 1071 Westmoreland Substation</b>	<b>Line 2167 Westmoreland Substation</b>
<b>3 Phase Amps – 100 MVA, 13.8 kV Base</b>	<b>4,347 Symmetrical Amps X/R = 4.0</b>	<b>4,133 Symmetrical Amps X/R = 3.5</b>
<b>1 Phase Amps – 100 MVA, 13.8 kV Base</b>	<b>3,896 Symmetrical Amps X/R = 3.1</b>	<b>3,630 Symmetrical Amps X/R = 2.7</b>

The estimated values of fault current may change at any time, without notice to the customer. The value may range from the guaranteed maximum of 6,300 symmetrical to the estimated minimum of 1,200 symmetrical.

The customer's service entrance over-current protection settings are as follows:

**Phase Settings:**

Relay – ABB C0-8  
Curve – Inverse  
CT Ratio – 120/1  
Phase Setting – 3 A (Secondary); 360 A (Primary); Delay (40 Cycles @ 400% of Pickup)  
No Instantaneous

**Ground Relay**

Relay – ABB C0-8  
Curve – Inverse  
CT Ratio – 120/1  
Phase Setting – 2.5 A (Secondary); 300 A (Primary); Delay (40 Cycles @ 400% of Pickup)  
No Instantaneous

Mr. Robert J. Verhelle - HNTB CORPORATION  
SEPTA Substation at 2440 N. Park Avenue - Available Fault Current and Upstream Over-Current  
Device Settings

August 15, 2016 page 2

The PECO upstream over-current protection settings associated with Line 1071 and Line 2167  
services are as follows:

**PECO Line 1071 Relay**

Relay – Schweitzer SEL-351-OM

Curve – U1 (Moderately Inverse)

CT Ratio – 240/1

Phase Setting – 4.0 A (Secondary); 960 A (Primary); Time Dial – 2.55

Ground Setting – 2.67 A (Secondary); 640.8 A (Primary); Time Dial – 2.55

No Instantaneous on Phase or Ground

**PECO Line 2167 Relay**

Relay – Schweitzer SEL-351-OM

Curve – U1 (Moderately Inverse)

CT Ratio – 240/1

Phase Setting – 2.5 A (Secondary); 600 A (Primary); Time Dial – 2.12

Ground Setting – 2.5 A (Secondary); 600 A (Primary); Time Dial – 2.12

No Instantaneous on Phase or Ground

Our comments do not relieve the designer of the responsibility for an adequate design. The  
designer has the responsibility that the installation is in accordance with the National Electrical  
Code, the National Electrical Safety Code and other codes that apply. The design shall also meet  
requirements listed in PECO's *Electric Service Requirements* handbook. A link to this document  
is attached here for your convenience.

<https://www.peco.com/PartnersinBusiness/BuildersandContractors/Pages/Guidelines.aspx>

If you have any questions concerning these comments, please contact me on (610) 725-7174.

Sincerely,

Chuck Boeggeman  
Senior Engineer  
PECO Energy (An Exelon Company)  
Distribution Standards  
1050 West Swedesford Road  
Berwyn, PA 19312  
charles.boeggeman@exeloncorp.com  
610-725-7174 (Voice)

CJB/

Available Fault Current and PECO Upstream Over-Current Protection Settings (T-8329).doc-89

cc: M. P. Keller – Manager, Distribution Standards & Customer Engineering  
P. M. Kirlin – Senior Account Executive, ESO

September 2, 2016

Mr Robert Verhelle  
 HNTB Corporation  
 2 West Lafayette St  
 Suite 280  
 Norristown Pa 19401

Subject: SEPTA Louden Sub  
 13.2 KV Service Fault Duty

Dear Mr Robert Verhelle:

As requested in your e-mail dated 8/10/2016, the following 13.2 KV fault current information is provided to assist in your electrical system studies for SEPTA Louden Sub, 1410 W Louden St, Philadelphia. The maximum fault current from either PECO-Energy's circuit is **6,300** Amps, symmetrical (X/R=26) and the minimum is estimated at 1,200 Amps, symmetrical (X/R=2). An estimation of the actual fault currents at the customer's 13.2 KV service substation, at this time is:

	<b>WESTMORELAND LINE-1077</b>	<b>TABOR-136</b>
<b>3 PHASE Amps @ 13.8 KV</b>	4,060 Sym Amps X/R = 3.4	3,928 Sym Amps X/R = 4.8
<b>1 PHASE Amps @ 13.8 KV</b>	3,544 Sym Amps X/R = 2.6	3,357 Sym Amps X/R = 3.6
<b>Circuit Length</b>	13,795 Ft	9,270 Ft

**The estimated values of fault current may change at any time, without notice to the customer. The value may range from the guaranteed maximum to the estimated minimum.**

This customer receives 13,200 Volt service and owns, operates, and maintains all of the 13,200 Volt service equipment and transformers. You should verify service switch, fuse, circuit breaker, and transformer ratings with the customer.

PECO's records indicate that the customer has a service circuit breaker with relays set as follows:

<b><u>T-8318 RELAY SETTNGS</u></b>
3 – Westinghouse CO-8 PHASE OVERCURRENT RELAYS, __ – __ Time – <u>INSTANTANEOUS – MODEL# CO-8H1111N Curve – INVERSE</u> 600 A PRI – 600/5 CT – 5 A TAP – Time 50 CYCLES @ 400% DELAY (TD ≈ __) Instantaneous Disconnected
1 – Westinghouse CO-8 GROUND OVERCURRENT RELAY, __ – __ Time – <u>INSTANTANEOUS – MODEL# CO-8L1111N Curve – INVERSE</u> 300 A PRI – 600/5 CT – 2.5 A TAP – Time 55 CYCLES @ 400% DELAY (TD ≈ __) Instantaneous Disconnected
3 – Westinghouse CR-8 Directional PHASE OVERCURRENT RELAYS, __ – __ Time – <u>INSTANTANEOUS – MODEL# 1875579 Curve – INVERSE</u> 240 A PRI – 600/5 CT – 2 A TAP – Time 15 CYCLES @ 400% DELAY (TD ≈ __) No Instantaneous

Mr Robert Verhelle  
SEPTA Loudon Sub  
September 2, 2016 page 2

The next available upstream overcurrent devices from the customer service relays are PECO's Line overcurrent relays, which are as follows:

**TABOR-136 – GECO 12IAC53B**

- Phase % Ground Elements - Very Inverse
  - 600 Amp primary pick-up Time Delay 70 Cycles @ 400%
  - No Instantaneous

**WESTMORELAND LINE-1077 – SEL-351**

- Phase Elements - Curve #U1 Moderately Inverse
  - 960 Amp primary pick-up Time Dial = 1.49
  - No Instantaneous
- Ground Element - Curve #U1 Moderately Inverse
  - 640 Amp primary pick-up Time Dial = 1.74
  - No Instantaneous

Our comments do not relieve the designer of the responsibility for an adequate design. He has the responsibility that the installation is in accordance with the National Electrical Code, the National Electrical Safety Code and other codes which apply.

If you have any questions concerning these comments, please contact me on (215) 956 - 3357.

Sincerely,

Barry N. Hornberger  
Distribution Standards  
Customer Engineering  
400 Park Ave  
Warminster, PA 18974

bnh/FAULT T-8318 SEPTA Loudon Sub 2016=0319.doc-37  
cc: P.M. Kirlin  
M.P. Keller

September 1, 2016

Mr Robert Verhelle  
HNTB Corporation  
2 West Lafayette St  
Suite 280  
Norristown Pa 19401

Subject: SEPTA Castor Sub  
13.2 KV Service Fault Duty

Dear Mr Robert Verhelle:

As requested in your e-mail dated 8/10/2016, the following 13.2 KV fault current information is provided to assist in your electrical system studies for SEPTA Castor Sub, 8355 Castor Ave Philadelphia. The maximum fault current from PECO-Energy's circuit is **6,300** Amps, symmetrical (X/R=26) and the minimum is estimated at 1,200 Amps, symmetrical (X/R=2). An estimation of the actual fault currents at the customer's 13.2 KV service substation, at this time is:

**FOX CHASE - 138**

<b>3 PHASE Amps @ 13.8 KV</b>	<b>3,859 Sym Amps X/R = 5.4</b>
<b>1 PHASE Amps @ 13.8 KV</b>	<b>3,334 Sym Amps X/R = 4.1</b>
<b>Circuit Length</b>	<b>9,387 Ft</b>

**The estimated values of fault current may change at any time, without notice to the customer. The value may range from the guaranteed maximum to the estimated minimum.**

This customer receives 13,200 Volt service and owns, operates, and maintains all of the 13,200 Volt service equipment and transformers. You should verify service switch, fuse, circuit breaker, and transformer ratings with the customer.

PECO's records indicate that the customer has a service circuit breaker with relays set as follows:

<b><u>T-8307 RELAY SETTINGS</u></b>
3 – GECO IAC-51B PHASE OVERCURRENT RELAYS, __ – __ Time – __ INSTANTANEOUS – MODEL #12IAC51B4A Curve – INVERSE 320 A PRI – 100/5 CT – 16 A TAP – Time 25 CYCLES @ 400% DELAY (TD ≈ __) 1,400 A PRI – 100/5 CT – 70 A TAP – Instantaneous
NO GROUND OVERCURRENT RELAY

The next available upstream overcurrent device from the customer service relays are: PECO's 13.2 kV Service Terminal Pole fused cutouts – S&C K Speed Positrol fuses sized at 140 Amps

Mr Robert Verhelle  
SEPTA Castor Sub  
September 1, 2016 page 2

Our comments do not relieve the designer of the responsibility for an adequate design. He has the responsibility that the installation is in accordance with the National Electrical Code, the National Electrical Safety Code and other codes which apply.

If you have any questions concerning these comments, please contact me on (215) 956 - 3357.

Sincerely,

Barry N. Hornberger  
Distribution Standards  
Customer Engineering  
400 Park Ave  
Warminster, PA 18974

bnh/FAULT T-8307 SEPTA Castor Sub 2016=0320.doc-1

cc: P.M. Kirlin  
M.P. Keller