Daliana Coban
Lead Regulatory Counsel
Toronto Hydro-Electric System Limited
14 Carlton Street
Toronto, ON M5B 1K5

Telephone: 416.542.2627
Facsimile: 416.542.3024
regulatoryaffairs@torontohydro.com
www.torontohydro.com

February 11, 2015

via RESS e-filing – signed original to follow by courier

Kristen Walli, Board Secretary
Ontario Energy Board
PO Box 2319
2300 Yonge Street, 27th floor
Toronto, ON M4P 1E4

Dear Ms. Walli:

Re: EB-2014-0116 – Documents for the Oral Hearing

Toronto Hydro writes to the Ontario Energy Board ("OEB") in respect of the above-noted matter. Enclosed please find the following documents:

- Exhibit OH, Tab 1, Schedule 1 – Witness Panel List for the scheduled Oral Hearing; and
- Exhibit OH, Tab 1, Schedule 2 – Visual Compendium.

Please reach out if you have any questions.

Sincerely,

[original signed by]

Daliana Coban
Lead Regulatory Counsel
Toronto Hydro-Electric System Limited
regulatoryaffairs@torontohydro.com

DC:acc\encl.

EB-2014-0116 Toronto Hydro CIR – Oral Hearing Witness Panel List

Panel	Witnesses	Evidence	Issues	Interrogatories							Undertakings
1. Distribution Capital and System Maintenance	**Elias Lyberogiannis** *Manger, Long Term Strategy & Planning* **Jack Simpson** *Director, Generation & Capacity Planning* **Angela Rouse** *Supervisor, Capital Planning & Reporting* **Mike Walker** *General Manager, Engineering & Investment Planning* **Guillaume Paradis** *Manager, System Planning* **Rob Otal** *Supervisor, Strategic Analytics*	E1B, T2, S4 E1B, T2, S5 (*only DSP Metrics*) E2A, T1, T4, T6-T8 E2A, T5, S1 (*only s. 4*) E2A, T10* E2B (*except D4, E8.1-E8.6*) E4A, T2, S1 - S9 E4B, T1 E8, T2, S1* E9, T1, S1 (*only ss. 5.7 & 5.8*) E9, T1, S1, Appendix B E9, T2, S4	Issue 3.1[1] Issue 3.2[2] Issue 5.1 Issue 4.2[3] Issue 4.3[4] Issue 5.4 Issue 6.6[5]	1A-BOMA-1 1A-BOMA-3 1A-BOMA-4 1A-BOMA-7 1A-BOMA-8 1A-BOMA-10 1A-BOMA-11 1A-BOMA-12 1A-BOMA-13 1A-BOMA-16 1A-CCC-5 1A-CCC-7 1A-CCC-8 1A-CCC-14 1A-SEC-1 1A-VECC-3 1B-BOMA-26 1B-BOMA-27 1B-BOMA-28* 1B-BOMA-29 1B-BOMA-30 1B-BOMA-31 1B-BOMA-32 1B-BOMA-33 1B-BOMA-34 1B-BOMA-35 1B-BOMA-36 1B-BOMA-43 1B-BOMA-48 1B-BOMA-64 1B-BOMA-72	1B-CCC-16* 1B-CCC-19 1B-EP-1 1B-Staff-7 1B-SEC-4 1B-SEC-5 1B-SEC-6 1B-SEC-9 1B-VECC-2 2A-AMPCO-21 2A-AMPCO-22 2A-EP-8 2A-EP-9 2A-EP-10 2A-EP-11* 2A-Staff-29 2A-Staff-32 2A-SEC-1 2A-SEC-11 2A-SEC-12 2A-SEC-14 2A-SEC-15 2A-SIA-5 2A-VECC-8* 2A-VECC-9 2A-VECC-10 2A-VECC-12 2A-VECC-13 2A-VECC-14 2A-VECC-15 2A-VECC-16	2B-AMPCO-1 2B-AMPCO-2 2B-AMPCO-3 2B-AMPCO-4 2B-AMPCO-5 2B-AMPCO-6 2B-AMPCO-7 2B-AMPCO-8 2B-AMPCO-9 2B-AMPCO-10 2B-AMPCO-12 2B-AMPCO-11 2B-AMPCO-13 2B-AMPCO-14 2B-AMPCO-15 2B-AMPCO-16 2B-AMPCO-17 2B-AMPCO-18 2B-AMPCO-19 2B-AMPCO-20 2B-CCC-13 2B-CCC-25 2B-CUPE-1 2B-CUPE-2 2B-CUPE-3 2B-EP-9 2B-EP-12 2B-EP-13 2B-EP-14 2B-EP-15	2B-EP-16 2B-EP-17 2B-EP-19 2B-EP-20 2B-EP-21 2B-EP-22 2B-EP-23 2B-EP-24 2B-EP-25 2B-EP-27 2B-EP-28 2B-EP-29 2B-EP-30 2B-EP-31 2B-EP-32 2B-EP-33 2B-EP-34 2B-EP-35 2B-EP-36 2A-SEC-16 2B-SEC-17 2B-SEC-18 2B-SEC-19 2B-SEC-20 2B-SEC-21 2B-SEC-22 2B-SEC-23 2B-SEC-24 2B-SEC-25 2B-SEC-26	2B-SEC-27 2B-SEC-28 2B-SEC-29 2B-SEC-30 2B-SEC-31 2B-SEC-32 2B-SEC-33 2B-SEC-34 2B-SEC-35 2B-SEC-36 2B-SEC-37 2B-SEC-38 2B-SEC-40 2B-SIA-9 2B-SIA-10 2B-SIA-11 2B-SIA-12 2B-SIA-13 2B-SIA-14 2B-SIA-15 2B-SIA-16 2B-SIA-17 2B-SIA-18 2B-SIA-19 2B-SIA-20 2B-SIA-21 2B-SIA-22 2B-SIA-23 2B-SIA-24 2B-SIA-25	2B-SIA-26 2B-SIA-27 2B-SIA-28 2B-SIA-29 2B-Society-1 2B-Society-2 2B-Staff-33 2B-Staff-34 2B-Staff-35 2B-Staff-36 2B-Staff-37 2B-Staff-38 2B-Staff-39 2B-Staff-40 2B-Staff-41 2B-Staff-42 2B-Staff-43 2B-Staff-44 2B-Staff-45 2B-Staff-46 2B-Staff-47 2B-Staff-48 2B-Staff-49 2B-Staff-50 2B-Staff-51 2B-Staff-52 2B-Staff-53 2B-Staff-54 2B-Staff-55 2B-Staff-56	2B-Staff-57 2B-VECC-17 4A-EP-39 4A-EP-40 4A-EP-41 4A-EP-44 4A-EP-45 4A-EP-46 4A-EP-47 4A-SIA-34 4A-SIA-35 4A-SIA-36 4A-SIA-37 4A-SIA-38 4A-SIA-39 4A-VECC-36 4A-VECC-37 4A-VECC-38 4A-VECC-39 4A-VECC-42 4A-VECC-43 8-VECC-64 8-VECC-65 9-CCC-50 9-Staff-90 9-Staff-91 9-Staff-92 9-Staff-89 9-Staff-90 9-Staff-94	Undertaking TC J1.1 Undertaking TC J1.2 (EP50)* Undertaking TC J1.2 (EP51)* Undertaking TC J1.2 (EP52)* Undertaking TC J1.2 (EP53)* Undertaking TC J1.3 Undertaking TC J1.4 Undertaking TC J1.5 Undertaking TC J1.6 Undertaking TC J1.7 Undertaking TC J1.8 Undertaking TC J1.9 Undertaking TC J1.10 Undertaking TC J1.11 Undertaking TC J1.12 Undertaking TC J1.13 Undertaking TC J1.14 Undertaking TC J1.15 Undertaking TC J1.16 Undertaking TC J2.9C Undertaking TC J2.10 Undertaking TC J2.11* Undertaking TC J2.15 Undertaking TC J2.16 Undertaking TC J2.26 Undertaking TC J2.27 Undertaking TC J2.29 (CUPE6 -15)

[1] This panel will only deal with questions regarding the following OM&A programs: Preventative and Predictive Maintenance; Corrective Maintenance; Emergency Response; Emergency Preparedness; Control Center Operations; Operations Support Customer Driven Work; Operations Support Planning; Operations Support Work Program Execution Management Support; Operations Support Work Program Execution.

[2] Please refer questions regarding General Plant programs (except E8.7 Voice Radio and E8.8 Program Support) to Panel 3.

[3] Please refer questions regarding the mechanics of the new accounts to Panel 5.

[4] This panel will only deal with questions regarding the balances in Accounts 1555 and 1575. Please refer questions regarding the methods of disposition for these accounts to Panel 5.

[5] This panel will only deal with questions regarding the need/justification of operational specific service charges: i) Request for System Information and 2) Service Call - Customer Owned Equipment or Customer Missed Appointment. Please refer questions regarding the cost methodology applied to determine the specific service charges to Panel 3.

* Assigned to multiple panels.

EB-2014-0116 Toronto Hydro CIR – Oral Hearing Witness Panel List

Panel	Witnesses	Evidence	Issues	Interrogatories							Undertakings
2.Benchmarking & Productivity	**Mike Walker** *General Manager, Engineering & Investment Planning* **Darryl Seal** *Manager, Rates* **Steve Fenrick** *Leader of the Economics & Market Research Group at Power System Engineering Inc.* **Erick Sonju** *Vice President, Power Delivery Planning and Design at Power System Engineering Inc.*	E1B, T2, S5 PSE Reply Report	Issue 2.1 Issue 2.2 Issue 2.3	1A-BOMA-2 1A-BOMA-6 1B-BOMA-19 1B-BOMA-37 1B-BOMA-38 1B-BOMA-39 1B-BOMA-40 1B-BOMA-41 1B-BOMA-42 1B-BOMA-44 1B-BOMA-45	1B-BOMA-46 1B-BOMA-47 1B-BOMA-49 1B-BOMA-50 1B-BOMA-51 1B-BOMA-52 1B-BOMA-53 1B-BOMA-54 1B-BOMA-55 1B-BOMA-56 1B-BOMA-57 1B-BOMA-59	1B-BOMA-60 1B-BOMA-61 1B-BOMA-62 1B-BOMA-63 1B-BOMA-65 1B-BOMA-66 1B-BOMA-67 1B-BOMA-68 1B-BOMA-69 1B-BOMA-70 1B-BOMA-71 1B-BOMA-73	1B-BOMA-74 1B-BOMA-75 1B-BOMA-76 1B-BOMA-77 1B-BOMA-78 1B-BOMA-79 1B-BOMA-80 1B-BOMA-81 1B-BOMA-82 1B-BOMA-83 1B-BOMA-84 1B-BOMA-85	1B-BOMA-86 1B-BOMA-87 1B-BOMA-88 1B-BOMA-89 1B-BOMA-90 1B-BOMA-91 1B-CCC-15 1B-CCC-20 1B-EP-2 1B-EP-3 1B-EP-4 1B-EP-5	1B-EP-6 1B-SEC-8 1B-SIA-4 1B-Staff-3 1B-Staff-8 1B-Staff-9 1B-Staff-10 1B-Staff-11 1B-Staff-12 1B-Staff-13 1B-Staff-14 1B-Staff-15	1B-Staff-16 1B-Staff-17 1B-Staff-18 1B-Staff-19 1B-Staff-20 1B-Staff-21 1B-Staff-22 1B-Staff-23 1B-Staff-25 1B-Staff-26 1B-Staff-27 1B-VECC-5 3-BOMA-19	Undertaking TC J2.11* Undertaking TC J2.18 Undertaking TC J2.19 Undertaking TC J2.20 Undertaking TC J2.21
3. General Plant Capital and OM&A, Revenue Offsets, and Streetlighting	**Owen Nash** *Director, Operations Support Services* **Charlie Floriano** *Director, Application Services* **Wendy Cheah** *Manager, Finance Distribution Operations*	E2B, D4, E8.1 – E8.6 E2A, T5, S1 (*except ss. 4&5*) E2A, T5, S2 E4A, T2, S10 -S12, S16, S21 E4A, T5 E4A, T3 E3, T2 E8, T2, S1*	Issue 3.1[6] Issue 3.2[7] Issue 5.1[8] Issue 5.2 Issue 5.6 Issue 6.6[9]	1B-BOMA-39 1B-SEC-8 2A-SIA-6 2A-SIA-7 2A-SIA-8	2A-Staff-30 2A-Staff-31 2A-VECC-11 2A-VECC-19	2B-EP-26 2B-EP-37 2B-EP-38 2B-SEC-39	2B-Society-3 2B-Staff-58 2B-Staff-59 2B-VECC-18 2B-VECC-19	3-CCC-27 3-CCC-28 3-SIA-30 3-Staff-62	3-VECC-34 4A-CCC-37 4A-EP-42 4A-EP-48	4A-Staff-70 4A-SEC-45 8-CCC-47 8-Staff-83 8-VECC65	Undertaking TC J2.1 Undertaking TC J2.2 Undertaking TC J2.17 Undertaking TC J2.28

[6] This panel will only deal with questions regarding the following OM&A programs/evidence: Fleet and Equipment Services; Facilities Management; Supply Chain; Information Technology; Allocations & Recoveries; Purchase of Non-Affiliate Services and Shared Services.
[7] This panel will only deal with questions regarding General Plant programs in the DSP (except questions about E8.7 Voice Radio and E8.8 Program Support – please refer to Panel 1).
[8] This panel will only deal with questions regarding General Plant programs in the DSP (except questions about E8.7 Voice Radio and E8.8 Program Support – please refer to Panel 1).
[9] Please refer questions regarding the need/justification of operational charges to Panel 1, and regarding customer-care related specific service charges to Panel 4.

* Assigned to multiple panels.

EB-2014-0116 Toronto Hydro CIR – Oral Hearing Witness Panel List

Panel	Witnesses	Evidence	Issues	Interrogatories	Undertakings
4. Human Resources, Finance and Customer Care	**Shirley Powell** *Director, HR Systems, Planning & Rewards* **Asheef Jamal** *Controller, Finance* **Lauren Kirk** *Manager, Customer Care*	E1C, T3, S2 E1C, T4 E2A, T10* E4A, T1 E4A, T2, S13, 14 and 15 E4A, T4 E8, T2, S1*	Issue 3.1[10] Issue 3.2 Issue 6.6[11]	1A-BOMA-14 1A-CCC-6 1C-Staff-28 1A-SEC-2 1B-BOMA-14 1C-SEC-10 2A-EP-11* 4A-CCC-29 4A-CCC-30 4A-CCC-31 4A-CCC-32 4A-CCC-33 4A-CCC-34 4A-CCC-35 4A-CCC-36 4A-CCC-40 4A-CCC-41 4A-CCC-42 4A-CCC-43 4A-CCC-44 4A-CUPE-4 4A-CUPE-5 4A-Staff-63 4A-Staff-64 4A-Staff-65 4A-Staff-67 4A-Staff-68 4A-Staff-71 4A-Staff-72 4B-Staff-79 4A-SEC-41 4A-SEC-42 4A-SEC-43 4A-SEC-46 4A-SIA-31 4A-SIA-32 4A-SIA-33 4A-Society-4 4A-Society-5 4A-Society-6 4A-VECC-40 4A-VECC-41 4A-VECC-44* 4A-VECC-45 4A-VECC-47 4A-VECC-48 8-VECC-63*	Undertaking TC J1.2 (EP49)* Undertaking TC J1.2 (EP50)* Undertaking TC J2.3 Undertaking TC J2.4 Undertaking TC J2.5 Undertaking TC J2.6 Undertaking TC J2.7 Undertaking TC J2.8 Undertaking TC J2.9A & B Undertaking TC J2.29 (CUPE16-18)

[10] This panel will only deal with questions regarding the following OM&A programs/evidence: Human Resources and Safety; Customer Care; Finance; Common Costs and Adjustments; Charitable Donations and LEAP; and Workforce Staffing and Compensation.
[11] This panel will only deal with questions regarding the need/justification of ccustomer-care related specific service charges: i) Duplicate invoices for previous billing; ii) Request for other billing information; iii) Account history; iv) Returned cheque charge (plus bank charges); v) Account set up charge/change of occupancy charge; vi) Special meter reads; vii) Collection of account charge - no disconnection; viii) Disconnect/Reconnect at meter - during regular hours ix) Install/Remove load control device - during regular hours x) Install/Remove load control device - after regular hours xi) Meter dispute charge plus Measurement Canada fees . Please note that items ii) and viii) relate to both Customer Care and non Customer Care functions. Please refer questions regarding the cost methodology applied to determine the specific service charges to Panel 3.
* Assigned to multiple panels.

EB-2014-0116 Toronto Hydro CIR – Oral Hearing Witness Panel List

Panel	Witnesses	Evidence	Issues	Interrogatories							Undertakings
5. Revenue Requirement, Regulatory Framework and Rates	**Andrew Herczeg** *Manager, Finance Operations* **Darryl Seal** *Manager, Rates* **Kaleb Ruch** *Senior Regulatory Policy Advisor* **Amanda Klein** *Vice President, Regulatory Affairs & General Counsel* **Joe Bile** *Manager, CDM Program Delivery & Business Development* **Greg Lyle (IRG)** *Owner, Innovative Research Group Inc.*	E1A E1B, T1 E1B, T2, S1, S2, S3, S6-S8 E1C, T1, S2 E1C, T3, S1 E2A, T3 and T9 E3, T1 E4A, T2, S17 and 18 E4B, T2 E5, E6, E7, E8 E9, T1, S1 (*except ss. 5.7, 5.8 and Appendix B)* E9, T2 (*except S4*)	Issue 1.1 Issue 1.2 Issue 2.1 Issue 2.2 Issue 2.3 Issue 2.4 Issue 2.5 Issue 3.1[12] Issue 4.1 Issue 4.2[13] Issue 4.3[14] Issue 4.4 Issue 5.3 Issue 5.5 Issue 6.1 Issue 6.2 Issue 6.3 Issue 6.4 Issue 6.5 Issue 6.7 Issue 7.1	1A-BOMA-5 1A-BOMA-9 1A-CCC-1 1A-CCC-2 1A-CCC-3 1A-CCC-4 1A-CCC-9 1A-CCC-10 1A-CCC-11 1A-CCC-12 1A-SEC-3 1A-VECC-4 1B-BOMA-58 1B-BOMA-28* 1B-CCC-21 1B-CCC-22 1B-CCC-15* 1B-CCC-16*	1B-CCC-17 1B-CCC-18 1B-CCC-26 1B-EP-7 1B-Staff-1 1B-Staff-2 1B-Staff-4 1B-Staff-5 1B-Staff-6 1B-SEC-7 1B-SIA-1 1B-SIA-2 1B-SIA-3 1B-VECC-6 1B-VECC-7 2A-CCC-23 2A-Staff-32	2A-SEC-13 2B-CCC-24 3-BOMA-15 3-BOMA-17 3-BOMA 18 3-BOMA-20 3-BOMA-21 3-BOMA-22 3-BOMA-23 3-BOMA-24 3-BOMA-25 3-CCC-26 3-Staff-60 3- Staff-61	3-VECC-20 3-VECC-21 3-VECC-22 3-VECC-23 3-VECC-24 3-VECC-25 3-VECC-26 3-VECC-27 3-VECC-28 3-VECC-29 3-VECC-30 3-VECC-31 3-VECC-32 3-VECC 33 3-VECC-35 4A-CCC-38 4A-CCC-39 4A-EP-43	4A-Staff-66 4A-Staff-69 4A-SEC-44 4A-SIA-40 4A-SIA-41 4A-SIA-42 4A-VECC-44* 4A-VECC-46 4B-Staff-73 4B-Staff-74 4B-Staff-75 4B-Staff-76 4B-Staff-77 4B-Staff-78 4B-Staff-80 4B-SIA-43 5-CCC-45 5-Staff-81 5-Staff-89 5-VECC-49 7-VECC 50	7-VECC 51 7-VECC 52 7-VECC 53 7-VECC 54 7-VECC-55 8-CCC-46 8-CCC 47 8-Staff-82 8-Staff-84 8-SEC-03 8-VECC 56 8-VECC 57 8-VECC 58 8-VECC 59 8-VECC 60 8-VECC-61 8-VECC-62 9-CCC-48 9-CCC-49 9-SIA-44	9-Staff-85 9-Staff 86 9-Staff-87 9-Staff-88 9-Staff-89 9-Staff-92 9-Staff-93 9-Staff-94 9-Staff-95 9-Staff-96 9-VECC-66 9-VECC-67 9-VECC-68 9-VECC-69 9-VECC 82	Undertaking TC J1.2 (EP49)* Undertaking TC J1.2 (EP51)* Undertaking TC J1.2 (EP52)* Undertaking TC J1.2 (EP53)* Undertaking TC J2.12 Undertaking TC J2.13 Undertaking TC J2.14 Undertaking TC J2.22 Undertaking TC J2.23 Undertaking TC J2.24 Undertaking TC J2.25 Undertaking TC J2.28

[12] This panel will only deal with questions regarding Rates and Regulatory Affairs, and Legal Services programs only.
[13] This panel will only deal with questions about the mmechanics of the new accounts. Please refer questions regarding need/justification for the new account to Panel 1.
[14] Please refer questions regarding the balances in Accounts 1555 and 1575 to Panel 1.

* Assigned to multiple panels.

TORONTO HYDRO®

2015 - 2019 CIR VISUAL COMPENDIUM

Toronto Hydro-Electric System Limited
EB-2014-0116
Exhibit OH
Tab 1, Schedule 2
Filed: 2015 Feb 11
(46 pages)

PURPOSE

This is a **Visual Compendium** of the capital investment programs presented in Toronto Hydro's Distribution System Plan (Exhibit 2B). The scope of this compendium is limited to programs where visual aids are helpful in illustrating the primary investment driver and/or the nature of the proposed work.

PRIMARY DRIVER DESCRIPTION

Toronto Hydro developed a list of capital investment drivers, based on the OEB's example drivers, that indicate the primary reason that a program must be carried out. Below are the primary drivers of the programs visualized in this compendium.

FAILURE RISK

- There is the imminent risk of failure due to age or condition deterioration.
- The potential failures will result in severe reliability impacts to customers as well as potential safety risks to crew workers or to the public.

FUNCTIONAL OBSOLESCENCE

- Assets/asset installations that no longer align to Toronto Hydro's current operating processes and practices, including those assets with accessibility (ravines, rear lots, highway crossings) or serviceability (e.g. lack of spare parts, lack of ability perform maintenance, operational constraints) conflicts, which can result in increased reliability and/or safety-related risks.

RELIABILITY

- Maintain or improve reliability at a local, feeder-wide or system-wide level.

SAFETY

- Assets are exposing known safety-related hazards/risks to crew workers or the general public, or assets are an integral part of maintaining safe work practices, and the failure of those assets would result in safety-related hazard/risk exposure.

Ref: Exhibit 2B, Section A2, p. 7 and 8.

CONTENTS

SYSTEM RENEWAL INVESTMENTS (E6)

SYSTEM SERVICE INVESTMENTS (E7)

The programs below do not have supporting visuals but are referenced in detail in the Distribution System Plan.

SYSTEM ACCESS INVESTMENTS (E5)

- Metering (E5.1)
- Customer Connections (E5.2)
- Externally-Initiated Plant Relocations & Expansion (E5.3)
- Load Demand (E5.4)
- Generation, Monitoring, Protection & Control (E5.5)

SYSTEM RENEWAL INVESTMENTS (E6)

- Network Circuit Reconfiguration (E6.12)
- Stations Control & Monitoring (E6.16)
- Distribution System Communication Infrastructure (E6.22)

SYSTEM SERVICE INVESTMENTS (E7)

- Contingency Enhancement (E7.1)
- Feeder Automation (E7.3)
- Downtown Contingency (E7.7)
- Stations Expansion (including HONI contributions) (E7.9)
- Local Demand Response (E7.10)
- Energy Storage Systems (E7.11)

GENERAL PLANT INVESTMENTS (E8)

- Fleet and Equipment Services (E8.1)
- Facilities Management & Security (E8.2)
- Operational Center Consolidation (E8.3)
- IT Hardware Refresh (E8.4)
- IT Software (E8.5)
- ERP Implementation (E8.6)
- Voice Radio System (E8.7)
- Program Support (E8.8)

SYSTEM RENEWAL INVESTMENTS

DSP **E6.1**

Underground Circuit Renewal
Primary Driver — Failure Risk

Existing submersible vintage URD switch.
Ref: E6.1, p. 18 and 1.

New submersible and/or building vault SF6-insulated switch.

New building vault transformer.
Ref: E6.1, p. 9.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.2**

Paper-Insulated Lead-Covered (PILC) Piece-outs & Leakers

Primary Driver — Failure Risk

Leaking PILC cable with oil pooled on floor of chamber.
Ref: E6.2, p. 6 and 1.

Cable chamber with cables that require piecing out.

Oil leaking from PILC cable.
Ref: E6.2, p. 13 and 10.

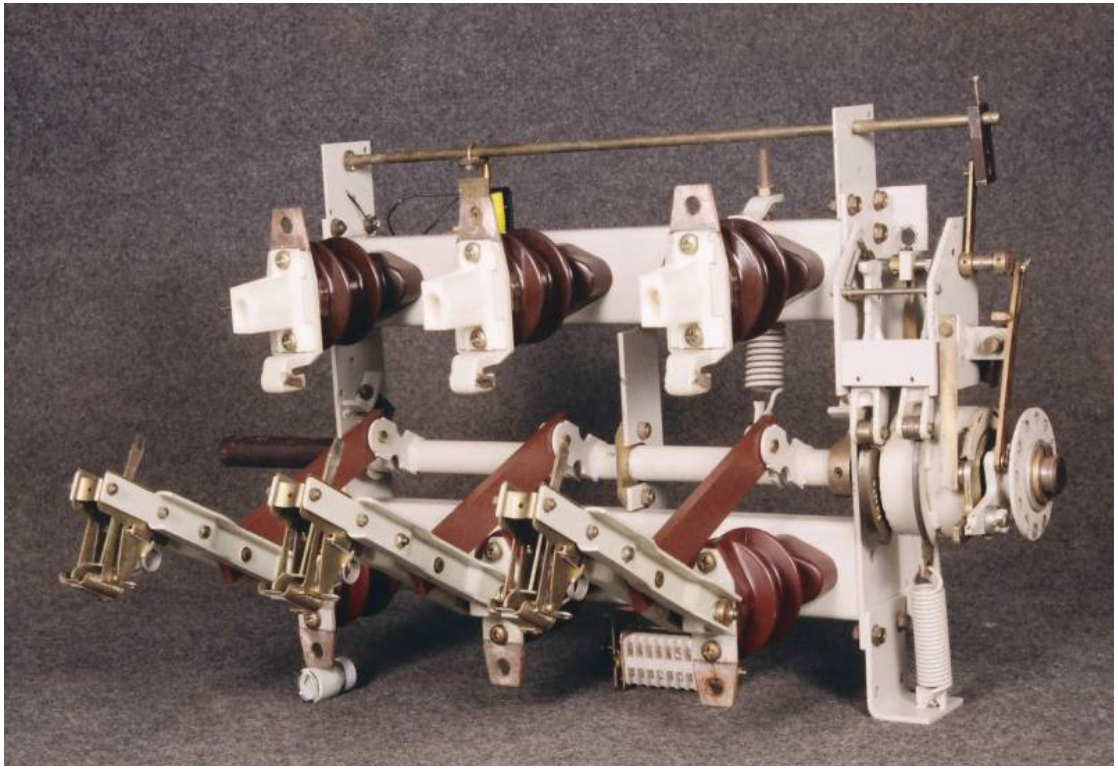
Cable chamber with properly racked cables.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.3**

Underground Legacy Infrastructure

Primary Driver — Functional Obsolescence



Aging and obsolete Sachsenwerk switches (pictured above) are no longer manufactured and have been known to fail catastrophically by flashing over during operation. Ref: E6.3, p. 7.

Obsolete Saschenwerk switch and fuse units in operation.

Obsolete Powerlite switches (picture left) were installed in the mid-1960s and are no longer manufactured. Remaining switches will be replaced due to age, obsolete configuration and safety concerns.
Ref: E6.3, p. 1.

Corroded and damaged transclosure enclosures. Transclosures are an obsolete underground transformer type with no like-for-like replacement options. These assets are difficult to restore in the event of an outage.
Ref: E6.3, p. 24.

SYSTEM RENEWAL INVESTMENTS

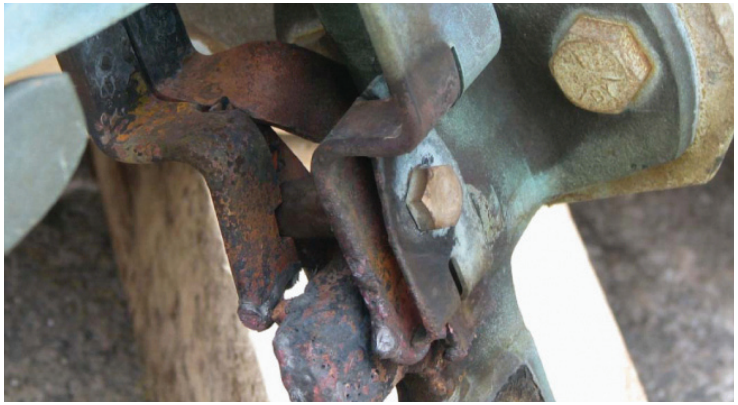
DSP **E6.4**

Overhead Circuit Renewal
Primary Driver — Failure Risk

Pole-top cracking.
Ref: E6.4, p. 17, 7 and 35.

New wood pole.

Example of catastrophic pole failure.



Severely corroded switch blade.

Broken porcelain insulator.
Ref: E6.4, p. 27.

Acadia Road pole failure.
Ref: E6.4, p. 24 and 38.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.5**

Overhead Infrastructure Relocation

Primary Driver — Functional Obsolescence

Feeders in ravine areas are difficult to access during restoration due to steep terrain and heavy vegetation. These assets are also vulnerable to storm and tree-related outages.
Ref: E6.5, p. 17 and 18.

Major asset failures along congested overhead lines exiting a station (pictured above) could result in the interruption of three or more entire feeders.
Ref: E6.5, p. 20 (re-photographed for image quality).

SYSTEM RENEWAL INVESTMENTS

DSP **E6.6**

Rear Lot Conversion
Primary Driver — Functional Obsolescence

Front lot of Thorncrest project — trees that would obstruct a front lot overhead line.
Ref: E6.6, p. 9, 15 and 16.

Access and clearances issues with swimming pool.

Clearance not met; fence makes it difficult to access pole.

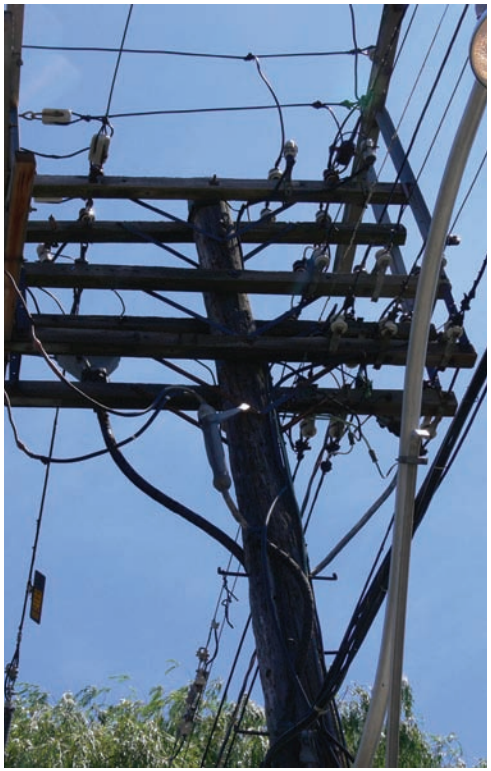
Completed rear lot conversion.
Ref: ICM Visual Support (EB-2012-0064).

SYSTEM RENEWAL INVESTMENTS

DSP **E6.7**

Box Construction Conversion

Primary Driver — Functional Obsolescence



Typical box construction design features a number of live, tightly packed circuits.
Ref: E6.7, p. 1 and 6.

Pictured left: Box construction pole prior to conversion.
Pictured right: The same pole after conversion to standard 13.8 kV configuration.

Inadequate clearance between box construction poles and buildings are forcing Toronto Hydro to reconfigure circuits to accommodate building construction.
Ref: E6.7, p. 19.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.8**

SCADA-MATE R1 Replacement
Primary Driver — Functional Obsolescence

Obsolete SCADA-Mate R1 switches (pictured above) are no longer manufactured and prone to failure due to defects.
Ref: E6.8, p. 1.

DSP **E6.9**

Network Vault Rebuild Program
Primary Driver — Failure Risk

Corroded i-beams.
Ref: E6.9, p. 17.

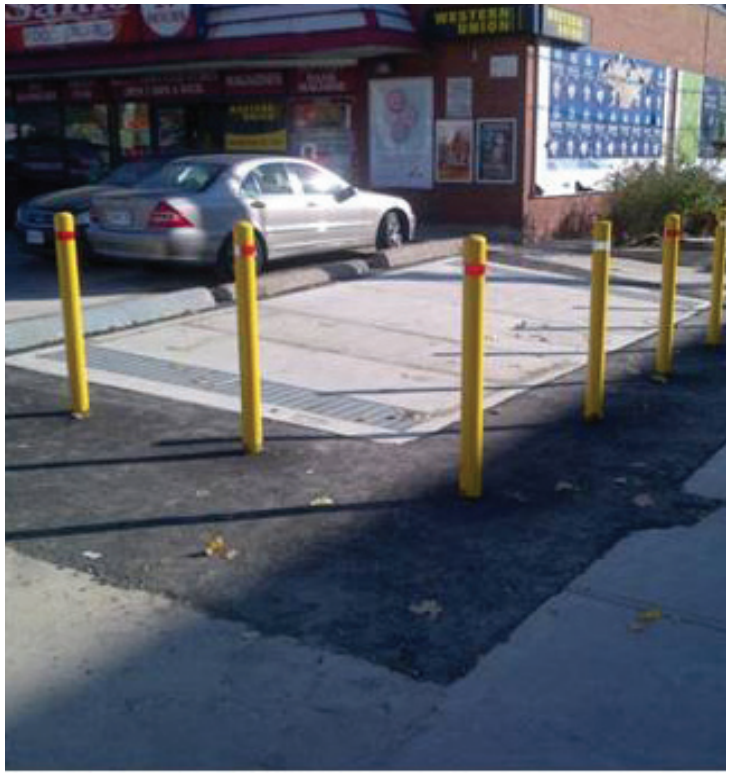
Cracked vault roof.

Cracked vault wall.
Ref: E6.9, p. 18 and 19.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.9**

Network Vault Rebuild Program
Primary Driver — Failure Risk



Completed vault rebuild.
Ref: E6.9, p. 12.

DSP **E6.10**

Network Unit Renewal Program
Primary Driver — Failure Risk

Fibertop network units pose a risk of failure and have been responsible for vault fires.
Ref: E6.10, p. 5, 13, and 7.

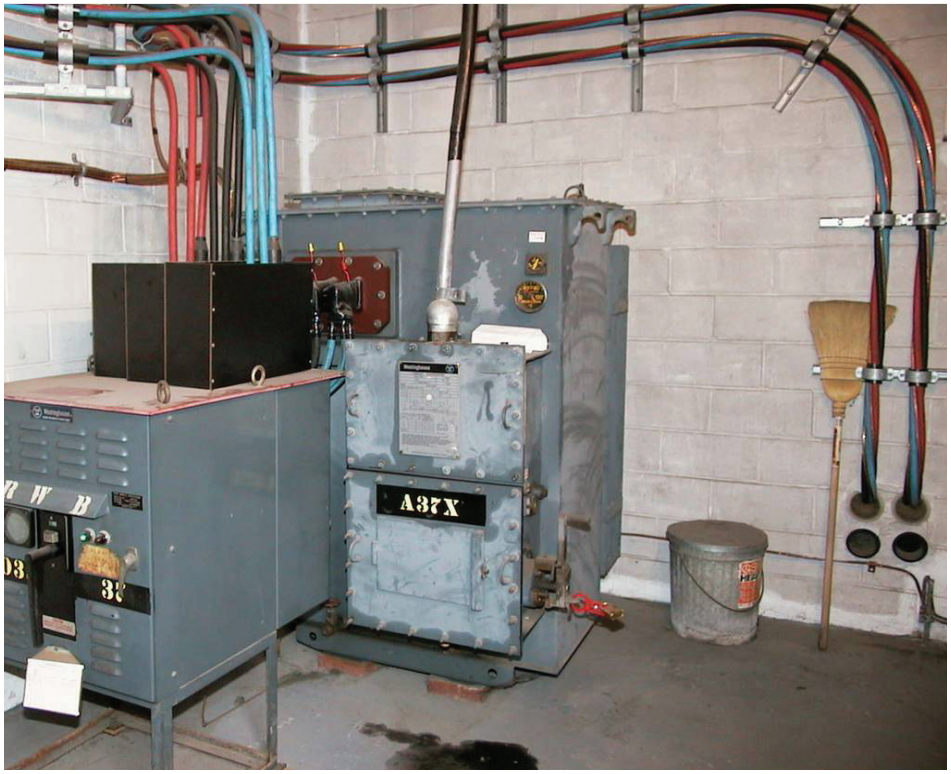
New standard submersible network units.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.11**

Legacy Network Equipment Replacement (ATS & RPB)

Primary Driver — Functional Obsolescence



RPB units are obsolete and prone to failure. These units are difficult to repair as the parts are no longer manufactured. Ref 6.11, p. 6 (2nd image re-photographed for image quality).

DSP **E6.13**

Stations Switchgear Renewal
Primary Driver — Functional Obsolescence

Aged and obsolete non-arc resistant brick structure TS switchgear at Carlaw TS.
Ref: E6.13, p. 6, 10 and 29.

New type C arc-resistant metal-clad switchgear with vacuum circuit breakers.

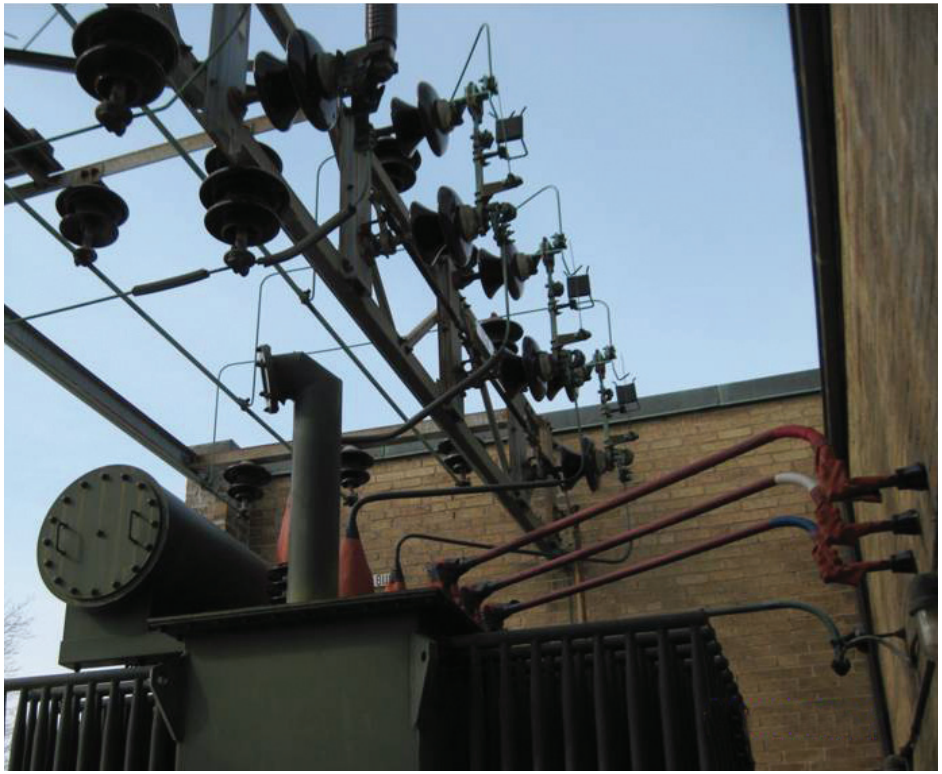
Impact of an internal arc fault in switchgear at Terauley TS.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.14**

Stations Power Transformer Renewal
Primary Driver — Failure Risk

The transformers and overhead bus structure (pictured above) are obsolete and have reached their end-of-life. Ref: E6.14, p. 9 and 7.



Overhead bus structure and transformers at Redcliff MS.

Failed power transformer at Dupont MS.
Ref: E6.14, p. 20.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.15**

Stations Circuit Breaker Renewal
Primary Driver — Functional Obsolescence

Typical aged and obsolete KSO oil circuit breaker.
Ref: E6.15, p. 6 and 9.

New standard outdoor vacuum circuit breaker.

Catastrophic failure of an outdoor oil circuit breaker at Manby Station.
Ref: E6.15, p. 13.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.17**

Stations Ancilliary Systems
Primary Driver — Failure Risk

Spare parts are no longer available for functionally obsolete air compressors, which are necessary to reliably operate circuit breakers. Ref: E6.17, p. 6 and 13.

Two station service transformers that require reconfiguration to mitigate impact of fire damage.

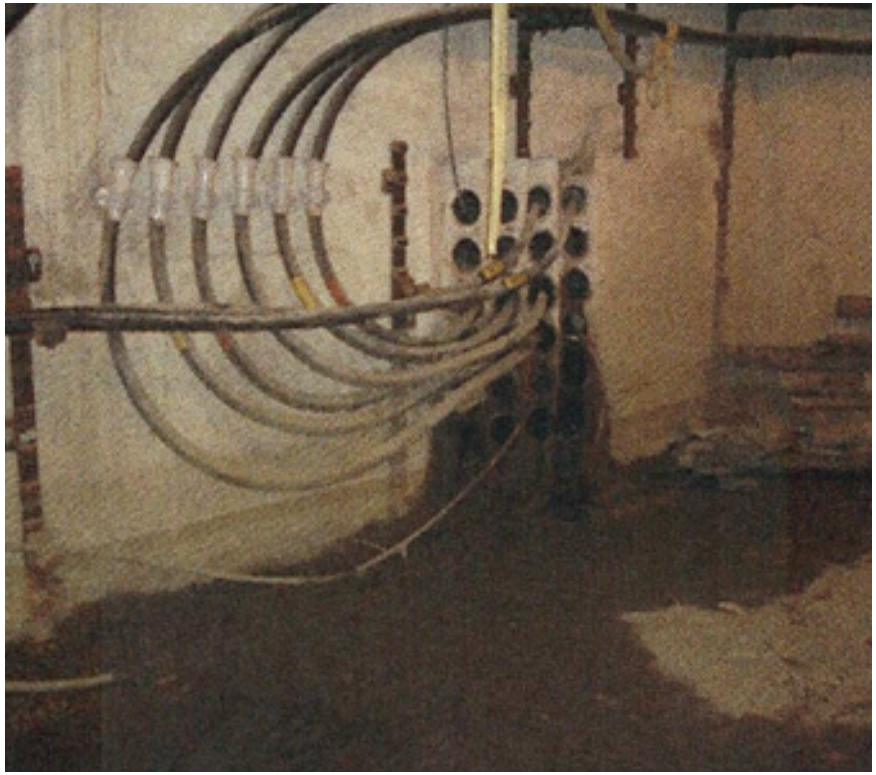
This transformer (pictured above) was damaged in a fire caused by a neighbouring transformer. Toronto Hydro is proposing to install fire systems in stations with two or more transformers.
Ref: E6.17, p. 21.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.18**

Station Buildings
Primary Driver — Failure Risk

Excessive water accumulation on the roof of Carlaw TS.
Ref E6.18, p. 11 and 13.



Cable chambers/pits showing sign of water infiltration at Carlaw TS.

Corrosion on the foundation walls of Terauley station.

Cable chamber wall and roof framing deterioration at High Level station.
Ref: E6.18, p. 17 and 20.

SYSTEM RENEWAL INVESTMENTS

DSP **E6.19**

Stations DC Battery Replacement

Primary Driver — Failure Risk

Legacy battery type requiring replacement. Batteries have a typical useful life of 10 years.
Ref: E6.19, p. 8.

Typical set up of 400Ah battery system (Battery bank on left and charger on right).

DSP **E6.20**

Reactive Capital
Primary Driver — Failure Risk

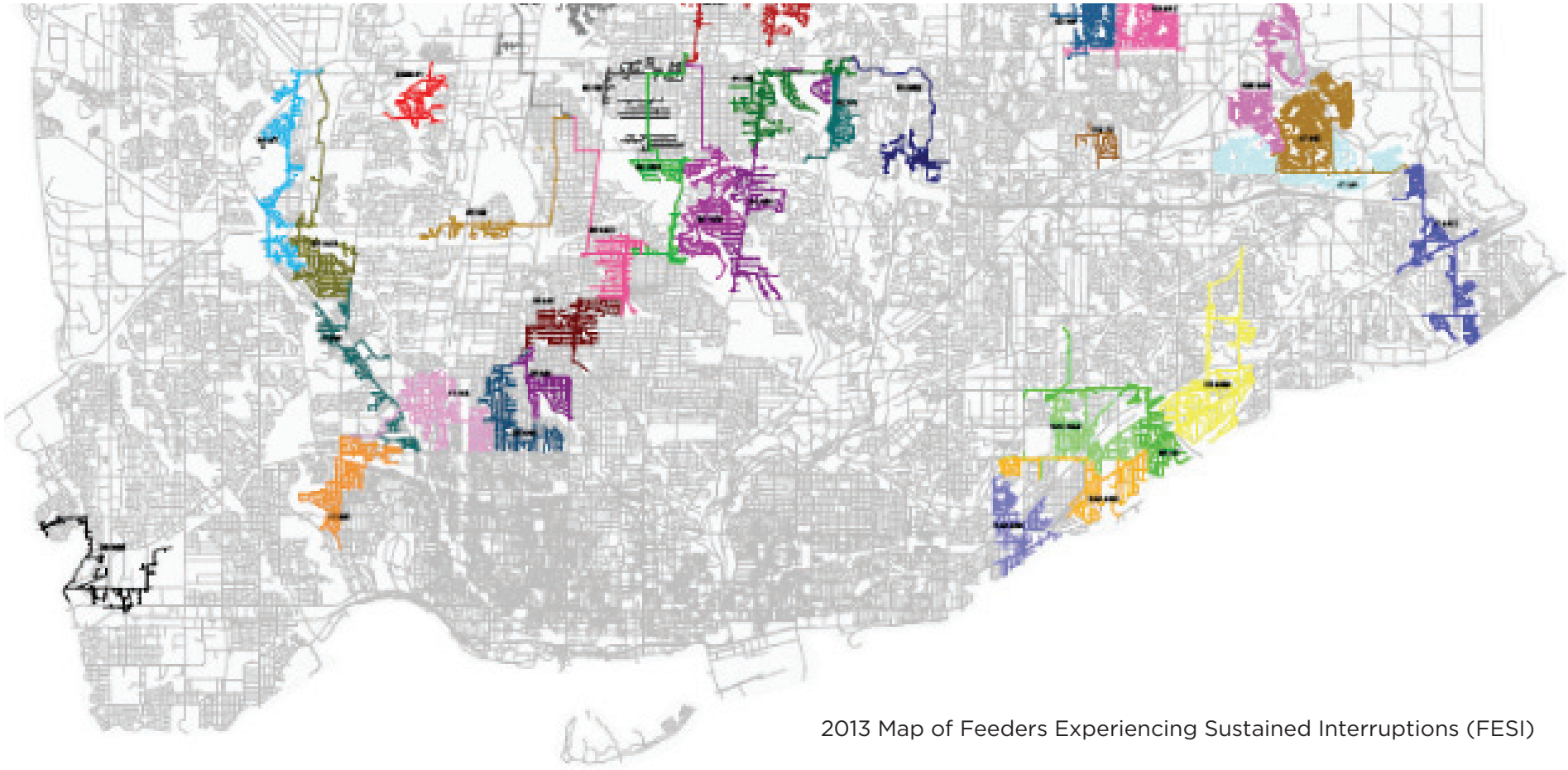
Failed protector.

Burnt AILC secondary cables.
Ref: E6.20, p. 8.

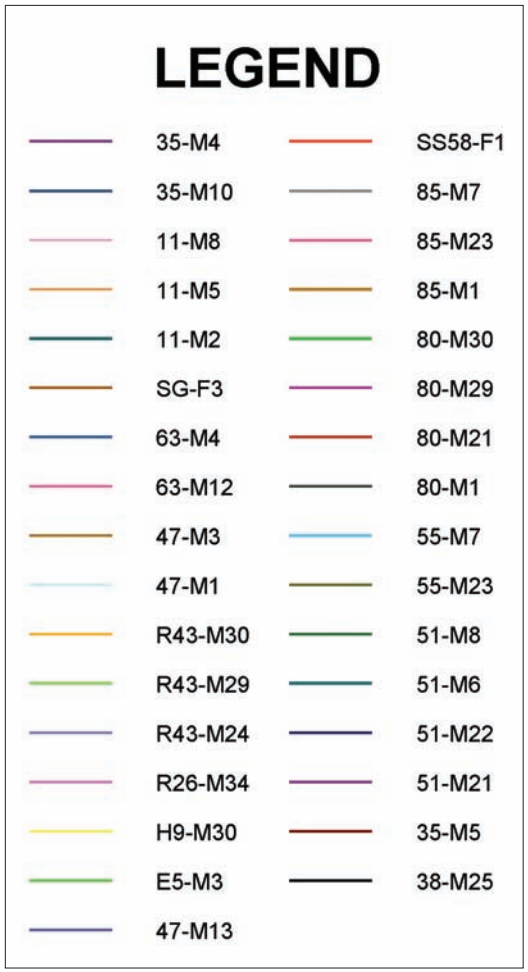
SYSTEM RENEWAL INVESTMENTS

DSP **E6.21**

Worst Performing Feeder
Primary Driver — Failure Risk



2013 Map of Feeders Experiencing Sustained Interruptions (FESI)


LEGEND
35-M4
35-M10
11-M8
11-M5
11-M2
SG-F3
63-M4
63-M12
47-M3
47-M1
R43-M30
R43-M29
R43-M24
R26-M34
H9-M30
E5-M3
47-M13
SS58-F1
85-M7
85-M23
85-M1
80-M30
80-M29
80-M21
80-M1
55-M7
55-M23
51-M8
51-M6
51-M22
51-M21
35-M5
38-M25

Ref: E6.21, p. 7.

SYSTEM SERVICE INVESTMENTS

DSP **E7.2**

Design Enhancement
Primary Driver — Reliability

Bare conductors surrounded by heavy vegetation are at risk of tree contacts.
Ref: E7.2, p. 1.

DSP **E7.4**

Overhead Momentary Reduction
Primary Driver — Reliability

Recloser installed on a pole. Reclosers are expected to mitigate the frequency of momentary interruptions where installed.
Ref: E7.4, p. 6.

SYSTEM SERVICE INVESTMENTS

DSP **E7.5**

Handwell Upgrades
Primary Driver — Safety

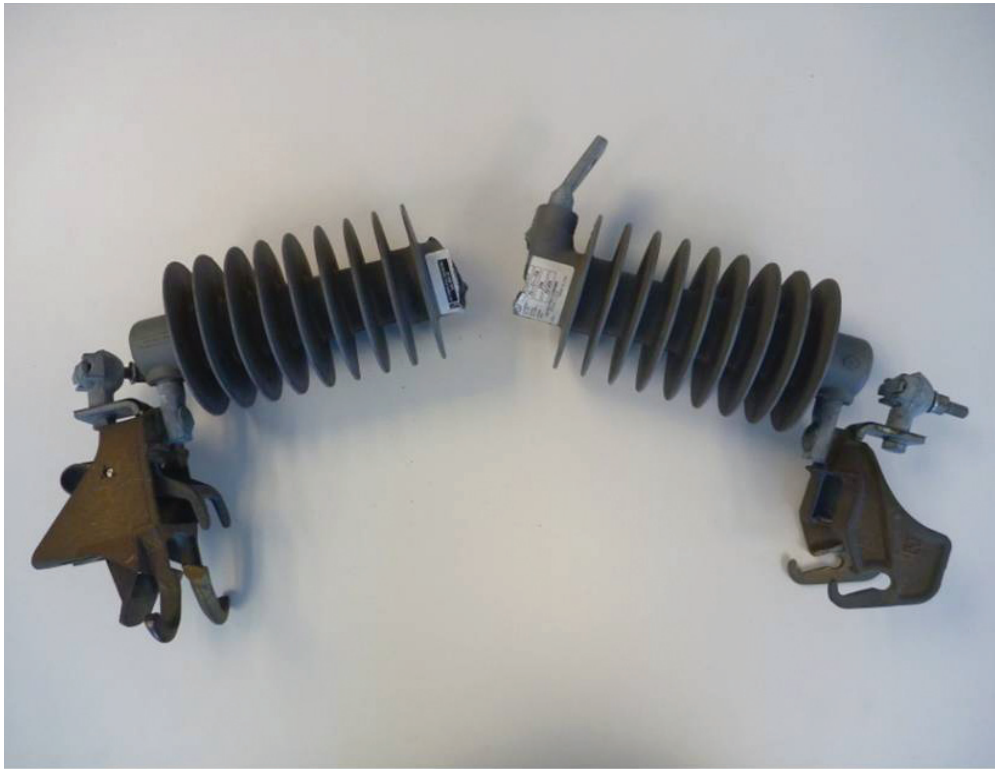
Non-conductive handwell.
Ref: E7.5, p. 4.

Legacy conductive handwells with defective conductors (pictured above) can become a public safety hazard.
Ref: R7.5, p. 9.

SYSTEM SERVICE INVESTMENTS

DSP **E7.6**

Polymer-SMD 20 Fuses
Primary Driver — Safety



Failed SMD-20 switch.
Ref: E7.6, p. 11 and 12.

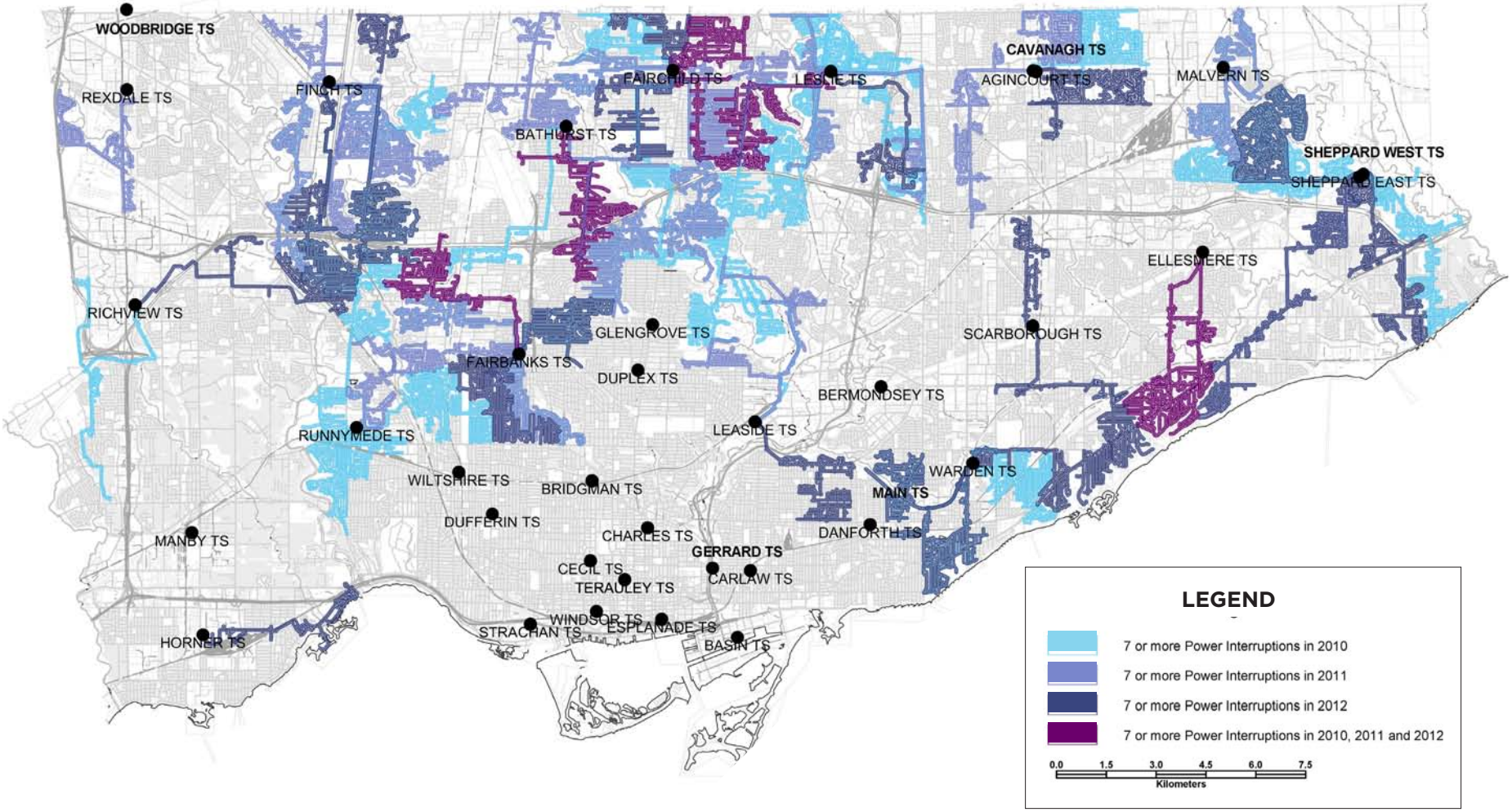
Failure after switch operation during testing.

DSP **E7.8**

Customer Owned Station Protection
Primary Driver — Reliability

Examples of aged and poorly maintained customer-owned equipment. Failure of customer-owned equipment can affect system reliability.
Ref: E7.8, p. 15.

SERVICE AREA



Ref: Exhibit 1B, Tab 2, Schedule 7. Appendix B – Customer Consultation Report, Appendix (Residential Workbook) p. 13.

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