nationalgrid

ADHOC INTERRUPTION SEARCH RESULTS

SEARCH CRITERIA

FROM DATE	07/01/2009 00:00:00
TO DATE	07/31/2014 23:59:59
FEEDER OUTAGE	Yes
REGULATORY MAJOR STORMS	Yes
COMPANY	Granite State Electric
Regulatory Criteria	Yes

1 **Event ID:** 7518033 **District :** Salem
Date: 11/30/2010 **Feeder Outage :** Yes **Distribution Type :** Overhead

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
42-18L1	A	SALEM		20:50	21:02	0 : 12	116	23	0.003	--	OLDE TROLLEY 18
42-18L1	BA	SALEM	MALL AT THE PKWY	20:50	21:39	0 : 50	1	1	0	0132-0005-00	
42-18L1	BA	SALEM	MALL AT THE PKWY	19:26	20:38	1 : 12	1	1	0	0132-0005-00	
42-18L1	BB	SALEM	MALL AT THE PKWY	19:26	01:24	5 : 58	22	131	0.015	0132-0009-00	
42-18L1	BB	SALEM	MALL AT THE PKWY	17:40	01:24	7 : 44	11	85	0.01	0132-0009-00	
					Event Totals		138	239	0.028		

Reportable Totals

Event Description :
ROCKINGHAM MALL: SWGR D HAD BLOWN A PHASE FUSE (1 OF 3) GOING TO TRANSFORMER PAD T9. FIRE DEPARTMENT REQUESTED AREA DE-ENERGIZED DUE TO SOME SMOKE PRESENT AT SWITCHGEAR AND CREW MANUALLY OPENED D1 LB IN SWGR TO ISOLATE. WHEN ATTEMPTING TO RESTORE SWGR D / T9, THE 18L1 STATION CIRCUIT BREAKER LOCKED OPEN AT OLD TROLLEY SUB. ISOLATED AREA AGAIN BY OPENING D1 LB AND CLOSED STATION BREAKER BACK IN. AFTER EXTENSIVE TESTING OF PRIMARY CABLE, TRANSFORMERS AND SECONDARY CABLES, CREWS FOUND FAILED UG CABLE BETWEEN T5 & T9, ISOLATED CABLE AND RESTORED CUSTOMERS. PowerOn Order Id: 1494830-1

Prepared By : Bodo, Richard J
Relay Targets:

2 **Event ID:** 7552887 **District :** Lebanon
Date: 03/18/2011 **Feeder Outage :** Yes **Distribution Type :** Overhead

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
41-6L3	A	HANOVER		04:42	07:05	2 : 23	0	0	0	--	HANOVER 6
41-6L3	A	LEBANON		04:42	07:05	2 : 23	2105	5017	0.578	--	
41-6L3	D	HANOVER	LEBANON ST	04:42	06:45	2 : 2	1496	3042	0.35	--	
					Event Totals		754	4839	0.557		

Reportable Totals

Event Description :
6L3 feeder lockout at Hanover Sub - cause UG fault P7-1 Hovey Ln to P11 Lebanon St - H connector failed - switched to isolate and restore customers, picked up end of the feeder on 16L1. PowerOn Order Id: 1546845-1

Prepared By : Bourque, Paul D
Relay Targets:

3 **Event ID:** 7588917 **District :** Salem
Date: 06/08/2011 **Feeder Outage :** Yes **Distribution Type :** Overhead

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
42-18L1	A	SALEM		07:07	07:53	0 : 46	0	0	0	--	OLDE TROLLEY 18
42-18L1	AB	SALEM	MALL AT THE PKWY	07:07	07:58	0 : 51	75	64	0.007	--	
42-18L1	AC	SALEM	MALL AT THE PKWY	07:07	08:18	1 : 11	28	33	0.004	--	
42-18L1	B	SALEM	MALL AT THE PKWY	07:07	08:43	1 : 36	33	53	0.006	--	
					Event Totals		137	150	0.017		

Reportable Totals

Event Description :
18L1 feeder locked out at Old Trolley Sub, swapped load onto alternate cables (feeds Rockingham Mall). UG cable fault MH1 to MH2, cable replaced. PowerOn Order Id: 1571187-1

Prepared By : Bodo, Richard J
Relay Targets:

4 **Event ID:** 7678802 **District :** Salem
Date: 04/09/2012 **Feeder Outage :** Yes **Distribution Type :** Overhead

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
42-18L1	A	SALEM		17:53	19:12	1 : 19	0	0	0	--	OLDE TROLLEY 18
42-18L1	AB	SALEM	MALL AT THE PKWY	17:53	18:56	1 : 3	74	78	0.009	--	
42-18L1	AC	SALEM	MALL AT THE PKWY	17:53	19:51	1 : 57	28	55	0.006	--	
42-18L1	B	SALEM	MALL AT THE PKWY	17:53	19:29	1 : 36	34	54	0.006	--	
					Event Totals		138	189	0.021		
					Reportable Totals		138	189	0.021		

Event Description :
18L1 feeder lockout at Old Trolley Sub. Cable fault in getaway. Swapped 4 switchgears at Rockingham Mall to alternate supplies. PowerOn Order Id: 1811485-1

Prepared By : Bodo, Richard J
Relay Targets:

5 **Event ID:** 7679476 **District :** Lebanon
Date: 04/21/2012 **Feeder Outage :** Yes **Distribution Type :** Overhead

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
41-16L1	A	HANOVER		01:19	03:24	2 : 5	35	73	0.008	--	WILDER 16 SWYD
41-16L1	A	LEBANON		01:19	03:24	2 : 5	0	0	0	--	
41-6L3	D	HANOVER	LEBANON ST	01:19	03:47	2 : 28	680	1677	0.193	--	HANOVER 6
41-6L3	E	HANOVER	LEBANON ST	01:19	03:24	2 : 5	797	1660	0.191	--	
					Event Totals		1512	3411	0.392		
					Reportable Totals		1512	3411	0.392		

Event Description :
16L1 Circuit breaker locked out at Mt Support Sub due to cable fault on 6L3 between Pole 7-1 Hovey Lane and Pole 11 Lebanon St, Hanover. Section of the 6L3 feeder was being carried by the 16L1 feeder for planned work at Hanover #6 Sub. Load past pole 1.5 Greensboro Rd on 16L1 had been mostly offloaded to 1L3 and was not affected. 16L1 & 6L3 feeders were sectionalized and customers were restored as patrolling was completed by crews. Dartmouth Hitchcock Medical Center remained alive via 16L4 feeder - Targets @ 16L1 - B phase & ground 2 counts. PowerOn Order Id: 1813575-1

Prepared By : Bourque, Paul D
Relay Targets:

6 **Event ID:** 7684688 **District :** Lebanon
Date: 06/13/2012 **Feeder Outage :** Yes **Distribution Type :** Overhead

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
41-6L2	A	HANOVER		13:40	16:30	2 : 50	40	113	0.013	--	HANOVER 6
41-6L2	CA	HANOVER	EAST SOUTH ST	13:40	16:10	2 : 29	32	79	0.009	--	
41-6L2	D	HANOVER	WEST SOUTH ST	13:40	16:18	2 : 38	46	121	0.014	--	
41-6L2	E	HANOVER	WEST SOUTH ST	13:40	15:57	2 : 17	571	1304	0.15	--	
					Event Totals		689	1618	0.186		
					Reportable Totals		689	1618	0.186		

Event Description :
6L2 feeder locked out at Hanover Sub due to failed Modular Joint in UG cable Express Section on 6L2 along South Main St by Dorrance Place Hanover NH. MH 1 was the Location of the fault. Manually switched to isolate area for repairs and restore customers. Fault indicators did not work properly and OH patrol found no cause, proceeded to sectionalize and shoot feeder to determine location of problem. PowerOn Order Id: 1826317-1

Prepared By : Bourque, Paul D
Relay Targets:

7 **Event ID:** 7751698 **District :** Lebanon
Date: 07/16/2013 **Feeder Outage :** Yes **Distribution Type :**

Feeder	Branch	Town	Street	Time Off	Time On	Duration	# Custs	Cust.	Rel. Min.

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
41-6L2	A	HANOVER		08:14	09:35	1 : 21	532	718	0.082	--	HANOVER 6
41-6L2	F	HANOVER	WEST WHEELOCK ST	08:14	09:42	1 : 28	152	223	0.025	--	
					Event Totals		684	941	0.107		
					Reportable Totals		684	941	0.107		

Event Description :
6L2 feeder lock out (C-Phase and Ground Targets / 2 Counts) at Hanover Sub / Cause was faulted U/G on the 6L2 getaway cable / Sectionalized with loadbreak @ P1.5 W. Wheelock St, Hanover. Front half of feeder picked up on 6L4 via LB @ MH 3 E. South St SWGR. Back half of feeder picked up on 6L3 via LB @ P2 N. College St. PowerOn Order Id: 2024234-1

Prepared By : Mota, Blaine M
Relay Targets:

8 **Event ID:** 7795603 **District :** Lebanon
Date: 01/06/2014 **Feeder Outage :** Yes **Distribution Type :**

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
41-6L4	A	HANOVER		09:52	11:53	2 : 0	51	102	0.012	--	HANOVER 6
41-6L4	D	HANOVER	EAST SOUTH ST	09:52	11:36	1 : 44	82	142	0.016	--	
					Event Totals		133	243	0.028		
					Reportable Totals		133	243	0.028		

Event Description :
6L4 FEEDER LOCKED OUT AT HANOVER SUB DUE TO UNDERGROUND CABLE FAULT AT MANHOLE 3 SARGENT PL. MANUALLY SWITCHED TO ISOLATE FAILED UNDERGROUND CABLE FOR REPAIR AND RESTORE CUSTOMERS THROUGH ALTERNATE FEEDER SUPPLIES. B, C PHASE & GND TARGETS. PowerOn Order Id: 2072848-1

Prepared By : Bourque, Paul D
Relay Targets:

9 **Event ID:** 7820623 **District :** Salem
Date: 03/02/2014 **Feeder Outage :** Yes **Distribution Type :**

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
42-13L2	A	SALEM		14:04	16:21	2 : 17	0	0	0	--	SPICKET RIVER 13
42-13L2	DB	SALEM	MILLVILLE ST	14:04	14:31	0 : 28	973	446	0.052	--	
42-13L2	DBA	SALEM	ZION HILL RD	14:04	15:15	1 : 11	352	417	0.048	--	
42-13L2	DBA	WINDHAM	ZION HILL RD	14:04	15:15	1 : 11	42	50	0.006	--	
* 42-13L2	F	SALEM	BLUFF ST	14:04	14:08	0 : 4	327	22	0.003	--	
* 42-13L2	F	WINDHAM	BLUFF ST	14:04	14:08	0 : 4	381	26	0.003	--	
					Event Totals		2461	1833	0.212		
					Reportable Totals		1753	1784	0.207		

Event Description :
13L2 circuit breaker locked out at Spickett River Sub due to a faulted getaway cable (XLPE DIRECT BURIED CABLES) from the substation. Remotely and manually switched to restore customers to alternate feeder supplies. C phase and Ground targets, 3 operations. PowerOn Order Id: 2085678-1

Prepared By : Bourque, Paul D
Relay Targets:

10 **Event ID:** 7848007 **District :** Salem
Date: 04/23/2014 **Feeder Outage :** Yes **Distribution Type :**

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
42-18L4	A	PELHAM		21:06	22:06	1 : 0	3	3	0	--	
42-9L1	A	SALEM		21:06	01:36	4 : 30	952	4281	0.486	--	
42-9L3	A	SALEM		21:06	01:30	4 : 24	412	1815	0.206	--	
42-18L1	A	SALEM		21:06	01:06	4 : 0	163	653	0.074	--	
42-18L3	A	SALEM		21:06	01:35	4 : 30	644	2894	0.329	--	OLDE TROLLEY 18
42-9L2	A	SALEM		21:06	01:37	4 : 31	129	582	0.066	--	
42-18L4	A	SALEM		21:06	22:06	1 : 0	837	844	0.096	--	
42-18L2	A	SALEM		21:06	00:43	3 : 37	0	0	0	--	
42-9L3	A	WINDHAM		21:06	01:30	4 : 24	0	0	0	--	

42-18L4	A	WINDHAM		21:06	22:06	1 : 0	1	1	0	
42-18L2	G	SALEM	CLUFF CROSSING RD	21:06	00:59	3 : 53	1119	4345	0.494	--
42-9L3	H	SALEM	NORTH POLICY ST	21:06	23:08	2 : 3	142	290	0.033	--
42-9L3	H	WINDHAM	NORTH POLICY ST	21:06	23:08	2 : 3	507	1035	0.118	--
					Event Totals		5596	19303	2.194	
					Reportable Totals		5596	19303	2.194	

Event Description :

1T115 circuit switcher locked out at Golden Rock Sub. Auto bus transfer started but did not succeed, neither 2393 nor 2352 was picked up from West Methuen 23kV. Barron Ave Sub transferred OK to 2353 line. For planned work, the 2393 line was out from Barron Ave Sub 93-4 loadbreak to Salem Depot Sub. This resulted in loss of supply to Salem Depot and Old Trolley Subs. Via SCADA, closed 52-53 tie breaker at Golden Rock and it locked out. Closed 93-76 tie breaker at Golden Rock successfully, but no load was restored due to system configuration. Picked up 4 feeders at Old Trolley Sub on feeder ties. Cleared red tags, closed 2394 line to Salem Depot to restore 3 feeders. Closed 2393 PTR to re-energize Old Trolley, and it locked out (assuming faulted arrester or U/G cable). Successfully re-energized 1T at Golden Rock. Patrol of 2352 found no fault. Isolating and testing 2352 U/G getaway cable at Golden Rock, possible close-in fault tripped circuit switcher. **follow-up notes: 2352 getaway at Golden Rock Sub had two terminations replaced - 2393 cable from PTR to Old Trolley Sub, found failed joint, which was re-made - also after second lockout on 4/25, found the TNG on 1TR was set too close to 2352 ground inst, relays re-adjusted. This first interruption would have resulted in a customer outage, without the relay issue, 2393 out planned, 2352 cable fault.*** PowerOn Order Id: 2099610-1 PowerOn Order Id: 2099622-1 PowerOn Order Id: 2099620-1 PowerOn Order Id: 2099607-1 PowerOn Order Id: 2099631-1 PowerOn Order Id: 2099606-1

Prepared By : Bodo, Richard J

Relay Targets:

11 **Event ID:** [7848670]

District : Salem

Date: 04/25/2014

Feeder Outage : Yes

Distribution Type :

Feeder	Branch	Town	Street	Time Off	Time On	Duration (hh:mm)	# Custs Affected	Cust. Out.	Rel. Min.	Transformer	Substation
42-18L4	A	PELHAM		03:20	03:43	0 : 22	3	1	0	--	
42-9L1	A	SALEM		03:20	03:38	0 : 18	952	289	0.033	--	
42-9L3	A	SALEM		03:20	03:38	0 : 18	554	168	0.019	--	
42-18L1	A	SALEM		03:20	03:38	0 : 18	163	49	0.006	--	
42-18L3	A	SALEM		03:20	03:42	0 : 22	644	238	0.027	--	
42-9L2	A	SALEM		03:20	03:38	0 : 18	129	39	0.004	--	
42-18L4	A	SALEM		03:20	03:43	0 : 22	837	313	0.036	--	
42-18L2	A	SALEM		03:20	03:42	0 : 22	1652	593	0.067	--	
42-9L3	A	WINDHAM		03:20	03:38	0 : 18	12	4	0	--	
42-18L4	A	WINDHAM		03:20	03:43	0 : 22	1	0	0	--	
					Event Totals		4947	1666	0.189		
					Reportable Totals		4947	1666	0.189		

Event Description :

1T115 circuit switcher locked out at Golden Rock Sub (also locked out on 4/23 - see other IDS event). Auto bus transfer did not initiate, as the station was abnormal. At the time of the interruption, the 2352 breaker had been closed to energize U/G feeder getaway section that had been repaired, but there was an additional U/G fault. The 1TR trip resulted in loss of supply via 2393 which was carrying Salem Depot and Old Trolley Subs. Barron Ave Sub was still supplied from 2353 from the initial fault on 4/23 and was not affected. Via SCADA, closed 1T115 CS and 2393 breaker at Golden Rock to restore service. Further investigation found an additional fault on the 2352 U/G cable getaway, plus the 1TR TNG relay set too close to the 2352 ground relay, resulting in overtrips for close-in to substation faults. The 2352 lockout should not have affected any customers, but the improper transformer lockout resulted in a loss of supply. Note: 9L3 has a reduced customer count, because some of the feeder was left supplied from 13L2 after the switching on 4/23. PowerOn Order Id: 2100356-1 PowerOn Order Id: 2100355-1 PowerOn Order Id: 2100354-1 PowerOn Order Id: 2100353-1 PowerOn Order Id: 2100350-1 PowerOn Order Id: 2100349-1 PowerOn Order Id: 2100348-1

Prepared By : Bodo, Richard J

Relay Targets:

Search criteria:	NH ADHOC INTERRUPTION SEARCH RESULTS		
Begin Time:	5/1/2015 0:00	End Time:	10/1/2019 23:59

Event ID	Time Outage	Time Restored	Duration	Town	Feeder ID	Customers	Cause
21671	5/1/2015 14:57	5/1/2015 17:51	127.2		18L1	158	Insulation Failure - Cable
				Salem town			
Dispatch Remarks: 18L1 Breaker locked out due to UG cable fault at MH 35 Rockingham Mall.							
22480	6/20/2015 0:57	6/20/2015 3:49	172		10L2	284	Insulation Failure - Cable
				Salem town			
Dispatch Remarks: 10L2 Circuit Breaker locked out due to underground getaway cable fault. XLPE Direct Buried Cable							
26001	2/6/2016 19:39	2/7/2016 0:24	243.4		6L4	140	Insulation Failure - Cable
				Hanover town			
Dispatch Remarks: Hanover 6L4 Circuit Breaker locked out due to cable failure at MH6 South St.							
31743	1/10/2017 20:33	1/10/2017 21:22	127.7		39L2	529	Insulation Failure - Cable
				Lebanon city			
Dispatch Remarks: Slayton Hill 39L2 circuit breaker locked out due to an underground cable failure at Airport Rd							
34158	5/1/2017 15:47	5/3/2017 4:21	68.5		18L1	148	Insulation Failure - Other
				Salem town			
Dispatch Remarks: Circuit breaker 18L1 locked out due to failed T-splice in MH-35 Rockingham Mall							
35522	7/18/2017 15:07	7/19/2017 20:50	113		18L1	148	Insulation Failure - Other
				Salem town			
Dispatch Remarks: Olde Trolley circuit breaker 18L1 locked out due to underground cable failure.							
54677	8/28/2019 15:36	9/6/2019 13:17	40.7		6L2	158	Insulation Failure - Cable
				Hanover town			
Dispatch Remarks: PTR 755105 W. WEELOCK LOCKED OUT / UNDERGROUND CABLE FAULT BETWEEN P9 N MAIN AND P10 N COLLEGE. XLPE CABLES							

Heather Tebbetts

From: Joel Rivera
Sent: Monday, July 6, 2015 12:41 PM
To: Kurt Demmer; Chris Brouillard; Michael Pazzanese
Cc: Robert Blank; Patrick O'Neill; Anthony Strabone; Robert Johnson
Subject: RE: Barron Ave getaway cable

See comments in green.

From: Kurt Demmer
Sent: Thursday, July 02, 2015 2:43 PM
To: Joel Rivera; Chris Brouillard; Michael Pazzanese
Cc: Robert Blank; Patrick O'Neill; Anthony Strabone; Robert Johnson
Subject: RE: Barron Ave getaway cable

Comments in red

Kurt

****Please note my new office number and mailing address****

Kurt Demmer | **Liberty Utilities**
Director of Engineering and Electric Operations – NH
P: 603-216-3556 | C: 978-360-6740
E: kurt.demmer@libertyutilities.com
15 Buttrick Road, Londonderry, NH 03053

From: Joel Rivera
Sent: Thursday, July 02, 2015 1:32 PM
To: Chris Brouillard; Kurt Demmer; Michael Pazzanese
Cc: Robert Blank; Patrick O'Neill; Anthony Strabone; Robert Johnson
Subject: RE: Barron Ave getaway cable

Hello Chris
I have provided estimates for addressing all 3 feeders: Please take a look at the excel sheet. There is a sketch for each feeder.

- 10L2
  - I would not like to use the 23kV ROW for this given that there is a good chance we will need the pole space in the future. (Salem Study) I think the issue with Mrs Mullen may be increased with doing a lot of work in front of her house. As far as the railroad, we have the ability to do back to back spacer cable per 23kV pole, that's 4 circuits. You are also assuming that Barron ave will still be there. As a small not, you mention 9L2 in the 10L2 sketch. The pole set would be at her neighbors. We would have to set an anchor pretty close to her property but not sure where the property line is. We would still need the pole space for potential feeders based on the salem study. Also we have not decided which station from Baron/Salem Depot stays. I rather stay away from the ROW but that is my opinion.
  - Seems easier to head west and re route the feeder up Bagnell anyways. No new UG required.
  - $32,160
- 9L2/9L3

  - Would need to build an UG conduit system from station to W Main St and 2 – 1000kCMIL Cu. Figured might as well go with a 3X2 system. Why not go underground a short way out the side and put in poles along the dirt lot outside the station and use the poles going down central street. Again, this seems cheap and dirty but I don't foresee a lot of years coming out of Salem Depot Sub. I like this and think this is something we can definitely look into. Double ckt on Central St and part of W Main St. I will talk to Bob/Pat/Mike .
  - W Main St is very busy, especially at proposed riser pole.
  - Would also need to install dbl ckt from P5-P9 to get to the 9L2.
  - $263,350 seems high but you can take a look at my assumptions and adjust if needed. Good thing is that we can take care of 2 feeders.
- 13L2
  - Would need to build an UG conduit system from station to existing MH1 and 1 – 1000kCMIL Cu. Figured might as well go with a 3X2 system and add a 3 way MH in case in the future we need to head east with new feeders. Good Plan
  - $106,100, however if we have existing spare duct space when they build UG getaway for the 13L3 then we could consider using that. I have no UG data or manhole views.

Let me know you would like to proceed and if there are any questions.

Thanks

Joel

From: Chris Brouillard
Sent: Wednesday, June 24, 2015 8:45 PM
To: Kurt Demmer; Michael Pazzanese
Cc: Robert Blank; Dan Saad; Patrick O'Neill; Anthony Strabone; Robert Johnson; Joel Rivera
Subject: RE: Barron Ave getaway cable

Joel and Anthony - please prepare estimates (conceptual grade +/- 25% is fine) for installing a short UG run for 10L2 and rise on the 23kV poles with spacer cable to the end point. Also prepare similar estimates for 9L2 and 13L2. The Pelham feeder we pick up as part of the Pelham substation rebuild. I'll then work with Joel to figure out if we have any movement in projects in remainder of 2016 and 2017 to accommodate and phase in some of this work, beginning with 10L2.

Chris

Chris Brouillard | **Liberty Utilities**
Director of Engineering
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15 Buttrick Rd, Londonderry, NH

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From: Kurt Demmer
Sent: Wednesday, June 24, 2015 5:05 PM
To: Michael Pazzanese
Cc: Chris Brouillard; Robert Blank; Dan Saad; Patrick O'Neill; Anthony Strabone; Robert Johnson
Subject: Re: Barron Ave getaway cable

I am in favor of the under built option rather than the conduit option for the 10L2. The others are more reasonable replacement projects. At a minimum if we were strapped for capital to do all three then install the duct and install the cable at a staged approach based on age and neutral conductivity

Kurt Demmer
Sent from my mobile phone

On Jun 24, 2015, at 2:50 PM, Michael Pazzanese <Michael.Pazzanese@libertyutilities.com> wrote:

> Chris spoke with Rob and based on condition of this cable, we need to come up with a replacement plan ASAP. Cable grounding shield is in bad condition or does not exist. We will be back there again this year in my view. We also have several others getaways of the same year vintage 1973/1974, unjacketed concentric neutral at the following:
>
> - Barron Ave 10L2 DB getaway-950' conduit/3 MH's or shorten UG run and rise on 23 pole in ROW, run 477 to Kelly Rd.
> - Salem Depot-9L2 DB getaway 125' with new pole hardware
> - Spicket River 13L2 DB getaway. 200' with conduit and new MH that would tie in to new MH/conduit put in several years ago
> - Pelham 14L1 DB Getaway-defer until Project begins, but same type/year cable with similar issues
>
> Olde Trolley, Golden Rock and the 9L3, 13L3 are newer cable/installations with Olde Trolley and GR in conduit/MH system. First 3 are top priorities. Up north we are in much better shape.
>
> Mike
>
> Michael Pazzanese-**Liberty Utilities**- Electrical Substation Supervisor
> Cell: 603-475-6936
> michael.pazzanese@libertyutilities.com
> 9 Lowell Rd. Salem NH 03079

From: Chris Brouillard
Sent: Monday, June 22, 2015 7:57 PM
To: Robert Blank; Patrick O'Neill; Michael Pazzanese
Cc: Dan Saad; Kurt Demmer
Subject: RE: Barron Ave getaway cable

Thank you, Pat, Mike, Kurt, and Rob for your input and leadership during the repair process. I'm hoping that over our capital plan period we can proactively treat or replace the highest risk runs.

Chris **Brouillard** | **Liberty Utilities**
Director of Engineering
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From: Robert Blank
Sent: Monday, June 22, 2015 7:51 PM
To: Patrick O'Neill; Michael Pazzanese
Cc: Dan Saad; Kurt Demmer; Chris Brouillard
Subject: Barron Ave getaway cable

Report from Mike Pazz in the field is that Barron Ave substation cable has been repaired, blacktop has been laid down, and switching to restore feeder will commence shortly. Great job

to Pat and his guys for finding the initial failed cable, and Mike and all that were involved, for sticking through with the repairs and seeing it through to the end.

Great job guys, much appreciated.

Thank you,

Robert Blank | Liberty Utilities
Director of Electric Operations
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Sent from my iPhone

Liberty Utilities

TO: Chris Brouillard
FROM: Joel A Rivera
COPY: D. Champy, J. Scarpone, K. Demmer
DATE: July 18, 2013
SUBJECT: WR 15298088 - Replacement of Hanover 6L2 get-away cable

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The Hanover 6L2 feeder supplies approximately 700 Customers in the town of Hanover NH. It supplies a mix of residential and commercial customers along South Main Street, Maple Street, School Street, North Main Street and College Street including Dartmouth College and the Department of Public Works. Engineering recommends the replacement of approximately 1600 feet of underground get-away cable for an estimated cost of $800,000. This replacement is recommended for the following reasons:

- The underground get-away cable on this feeder has experienced 3 failures in the past 5 years. The latest failure occurred on July 16, 2013. Underground primary cable failures typically take longer to repair as compared to other failures. In addition, multiple failures pose a risk of damage to the company's reputation and subsequent regulatory intervention. There is an additional limited risk that as load continues to grow there will be no capacity to pick up all interrupted customers on feeder ties including Dartmouth College.
- The existing underground cable is 500 kCMIL Al XLPE of 1970's vintage and is installed in a direct buried arrangement. The cross linked polyethylene (XLPE) insulated cables of this vintage have a high failure rate. At that time, it was not known that voids and contamination in the insulation and shields as well as other design and manufacturing deficiencies, leads to voltage stress concentrations within the cable. These voltage stresses, combined with moisture creates water trees. These water trees degrade insulation over time, ultimately causing the cables to fail.
- The existing underground cable get-away strategy dictates that upon the first failure of a direct buried get-away cable, the cable is to be repaired as an emergency. Upon the second failure of a direct buried get-away cable, the cable should be repaired as an emergency and the cable should be replaced. Any replacement of direct buried cables should be with a duct lay cable system in accordance with current company construction standards.
- On average each failure event on the 6L2 feeder resulting from an underground get-away failure adds approximately .02 to system SAIFI and 2 minutes to system SAIDI.

For these reasons, engineering is recommending that we replace the existing direct buried 500 kCMIL Al XLPE cable with new 750 kCMIL AL EPR in a new underground conduit system along South Main Street. We will begin the engineering, design, and preliminary permitting activities associated with this project in parallel with seeking the necessary internal approvals to move forward with construction.

Signature…….. Date……
Chris Brouillard, Director of Engineering

Signature…….. Date……

Daniel Saad, Vice President Operations & Engineering

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