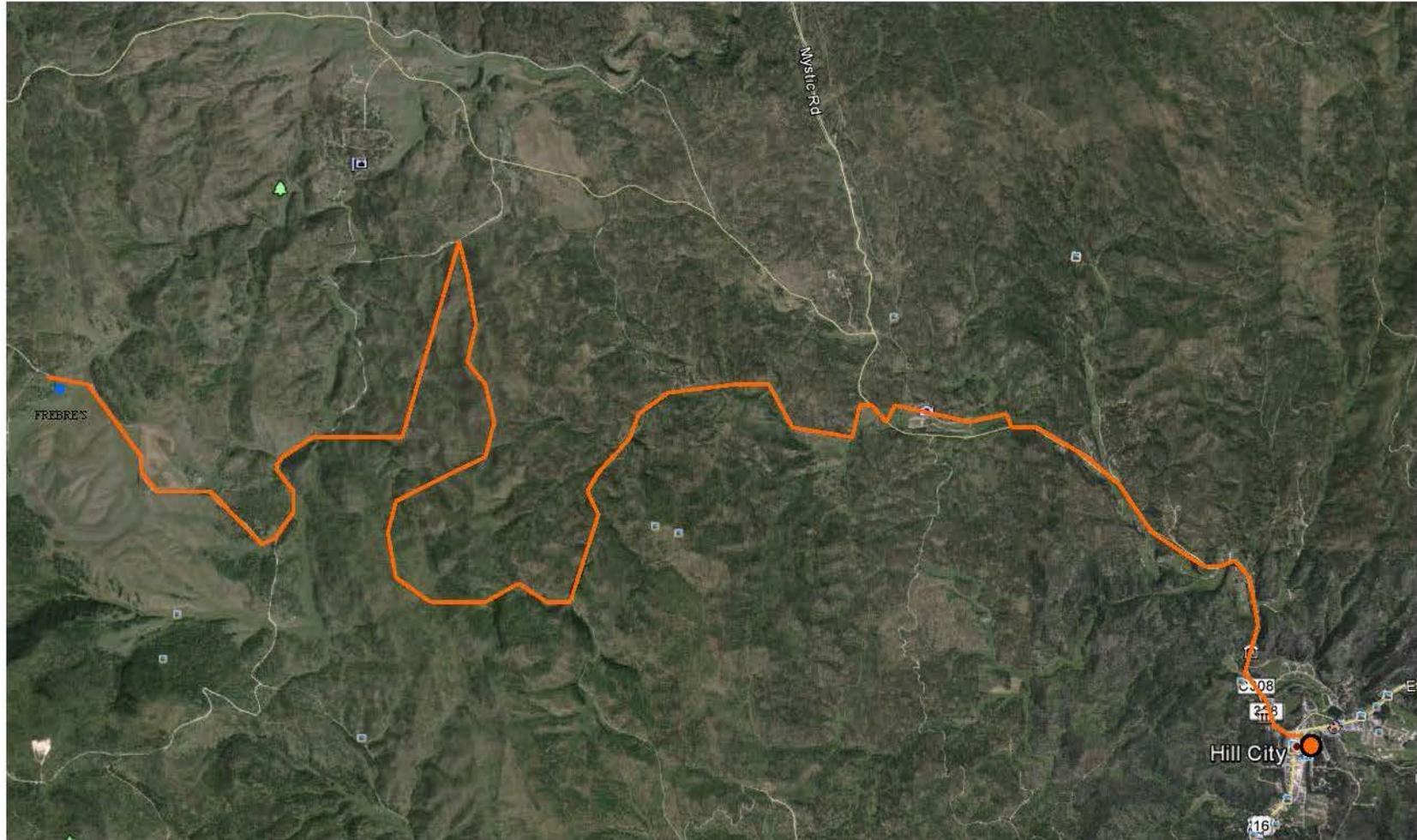


The Ferebees and Wilsons live in a remote area with a unique geological structure and weather conditions that have hampered the quality of their service. CenturyLink serves them with a digital carrier system which is 77,980 feet or 14.76 miles from the Hill City Central Office. This map shows the route CenturyLink's facilities follow to serve them:



The ground around these customers' homes contains a large quantity of metal, making it especially vulnerable to lightning strikes. The plant between Hill City and their home is very remote, difficult to reach and subject to severe weather, which can result in outages due to significant storms, such as washouts from floods.



CenturyLink has made extensive efforts to address those issues. Those efforts are outlined on the charts that follow for each customer:

**Ferebee Repair History:**

2013:

Report Date & Time	Commitment Date	Ticket Closed	Repair Notes
Friday July 20, 2013 - 12:10PM	7/22/2013	7/22/2013 - 12:50PM	Found OK - Suspect Cable Plant
Tuesday October 1, 2013 - 10:06AM	10/1/2013	10/1/2013 - 1:40PM	Replaced Digital Channel Card
Wednesday October 2, 2013 - 10:38AM	10/2/2013	10/2/2013 - 3:50PM	Replaced Digital Channel Card
Monday October 21, 2013 - 12:53PM	10/21/2013	10/21/2013 - 12:54PM	FE Closed Ticket - No Dispatch
Saturday December 7, 2013 - 8:40PM	12/9/2013	12/9/2013 - 4:20PM	Cable Trouble - Repaired

2014:

Report Date & Time	Commitment Date	Ticket Closed	Repair Notes
Monday January 20, 2014 - 8:12AM	1/21/2014	1/21/2014 - 4:20PM	Found OK - Suspected Cable Plant
Sunday January 26, 2014 - 5:11PM	1/28/2014	1/28/2014 - 4:04PM	Repaired Ground in Go-Digital Control Pair
Wednesday February 5, 2014 - 7:47AM	2/5/2014	2/5/2014 - 4:25PM	Customer's Inside Wiring - Repaired (Rodents)
Saturday June 14, 2014 - 10:38PM	6/15/2014	6/15/2014 - 2:08AM	Line Tests OK - Left Message for Customer
Sunday June 15, 2014 - 4:01PM	6/17/2014	6/17/2014 - 1:05PM	Good To Home - Intermittent / Came Clear
Thursday June 26, 2014 - 10:22PM	6/27/2014	6/27/2014 - 2:26PM	Lightning Crashed Go Digital

Saturday June 28, 2014 - 6:34PM	7/1/2014	7/1/2014 - 12:00PM	Replaced Office Card and Fuses Remote Terminal
Saturday August 30, 2014 - 8:18PM	9/3/2014	9/3/2014 - 1:30PM	Replaced Office Card and Fuses Remote Terminal
Friday October 3, 2014 - 4:49PM	10/6/2014	10/6/2014 - 2:30PM	Grounded BSW at Terminal - fixed cable

2015:

Report Date & Time	Commitment Date	Ticket Closed	Repair Notes
Monday May 11, 2015 - 8:34AM	5/11/2015	5/11/2015 - 9:09AM	No Trouble Found
Tuesday June 9, 2015 - 10:30AM	6/10/2015	6/10/2015 - 6:19AM	Repaired F1 Cable
Thursday June 11, 2015 - 1:16PM	6/15/2015	6/19/2015 - 2:28PM	Washed Out Cable - Remote Area - No Truck Access
Friday June 26, 2015 - 10:42AM	6/26/2015	6/26/2015 - 2:46PM	No Trouble Found
Monday June 29, 2015 - 10:02AM	7/2/2015	7/2/2015 - 2:00PM	Cable Issue BSW - Moved Cust to Different Channel
Tuesday July 14, 2015 - 12:25PM	7/17/2015	7/17/2015 - 6:20PM	Replaced Powered Repeater
Monday July 27, 2015 - 7:25AM	7/28/2015	8/14/2015 - 5:52PM	2 Problems - 1 Add/Drop repeater at the Ferebee home and 1 after the home. Odd that a repeater after the home was causing issues - we had to order parts was the cause of the delay; all other customers working before and after the Ferebee's
Tuesday August 18th - 8:54AM	8/18/2015	8/21/15 - 9:27AM	One of the repeaters replaced on 8/14/2015 died - replaced out of spares.

2016:

One outage:

Report Date – 3/1/2016 737am

Commit Date – 3/7/2016

Ticket Closed – 3/1/2016 at 10:30am

Repairs Made – Replaced Blown Fuse in Power Cabinet

Thunderstorm

### Wilson Repair History

2013:

Repair Reported	Commit Date	Repaired Date	Description
Friday 10/5/2013 8:55AM	10/9/2013 10-9-13	12:34PM	STORM CAUSD PG2 TO GO DOWN - (HISTORIC BLIZZARD / POWER)
Saturday 9-6-13 1:45P	9/6/2013 9-6-13	2:12PM	TALKED TO SUB PHONE NOW WORKNG
Tuesday 7/16/2013 9:53A	7/16/2013 7/16/2013		NO DISPATCH- LONG DISTANCE OUTAGE STATEWIDE
Saturday 7-13-13 7:25P	7/15/2013 7-15-13	2:15PM	FOUND OK SUSPECT PLANT - No Trouble Found
Wednesday 5-29-13 1:20P	5/30/2013 5-30-13	12:55PM	DEF HOUSING (Power)
Wednesday 4-24-13 7:52A	4/24/2013 4-24-13	11:30AM	EF PG MOUNTING GO DIG (BAD CARD)
Monday 4-22-13 12:49A	4/23/2013 4/23/2014		DIGITAL CHANNEL CARD (BAD CARD)
Thursday 4-11-13 5:11P	4/11/2013 4-11-13	5:12PM	no dispatch, no repair ticket authorized

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Repair Reported	Commit Date	Repaired Date	Description
Wednesday 9/24/2014	9/25/2014	9-25-14 - 3:30PM	TA DIE RESTORED - No Trouble Found
Saturday 8-30-14 9:21AM	9/4/2014	9-4-14 - 10:00AM	cable cut
Saturday 6-28-14 6:54PM	7/1/2014	7-1-14 - 1:30PM	REPLACE CO CARD AND FUSES AT RT (BAD CARD)
Thursday 6-26-14 9:42PM	6/27/2014	6-27-14 - 1:57PM	GDS NTF. UP AFTER STORM NTF-NO TROUBLE FOUND
Tuesday 6-24-14 9:54AM	6/24/2014	6-24-14 - 1:33PM	CANCELLED BY CUSTOMER
Sunday 6/15/2014 11:30AM	6/16/2014	6-16-14 - 1:30PM	POWER CYCLE REPEATER HOUSING (Power)

2015

Repair Reported	Commit Date	Repaired Date	Description
Tuesday 10-27-15 11:09AM	10/28/2015	10-28-15 5:22PM	NTF - Storm caused Power Outage - Suspected Battery Failure - Tested Batteries - GOOD
Tuesday 08-18-15 7:49AM	8/18/2015	08-18-15 8:08PM	No Trouble Found - Suspect Plant / Cable
Sunday 08-08-15 10:39AM	8/11/2015	08-11-15 6:44PM	REPLACED DIGITAL CHANNEL CARD

Tuesday 07-21-15 1:43PM	7/22/2015	07-24-15 3:10PM	No Trouble Found - Good to SNI - Subscriber Network Interface
Sunday 05-10-15 7:26PM	5/13/2015	05-13-15 2:42PM	REPLACED DIGITAL CHANNEL CARD

2016

NONE

### **Additional Measures to address service quality**

- In the spring of 2012, CenturyLink assigned a single technician in charge of service in this area so that the technician would know the history associated with their service. CenturyLink reviewed the cable pairs and repeater spacing to ensure that these components were best set up to provide them with service. CenturyLink made changes to repeater spacing and changed technology associated with those repeaters from straight through repeaters to add/drop repeaters. Add/drop repeaters rebuild and reframe data and improve the circuit that ultimately provides service to the home.
  
- When the problems persisted, CenturyLink brought a specialist to visit the area in November, 2014, to identify what additional measures could be taken. The specialist tested CenturyLink's repeaters in five of six available areas and audited the central office to determine if additional measures could be taken there.<sup>1</sup> The specialist recommended the following actions be taken:
  - **Field Recommendation**
    - Due to the area's rocky soil, a traditional ground field may not be effective enough at power dissipation. To mitigate this geographic nuance, the ground field should consist of a 40 foot linear trench 40" deep. Using LOW OHMS CONCRETE (6 bags per Repeater) and # 2 solid tinned copper conductor. The Low Ohm concrete should provide a more robust ground field at each repeater and reduce the Ohm reading closer to the standard of <25 Ohms. Once the ground field updates are complete, employ the High Voltage Protection plan for Go-Digital utilized to resolve a similar issue in New Mexico.
  
  - **Central Office (CO)**

<sup>1</sup> In the sixth location, CenturyLink was unable to access its repeater due to a locked gate and no trespassing signs placed by the landowner. CenturyLink is in the process of seeking access to those facilities.

- In the Central Office a new 2/0 ground cable should be placed from the Cable Entrance Ground Bar to the OPGP Bar (Central Office Ground Bar). This path allows any current fowling on the cable sheath to go directly out of the central office to the ground field or the main ground natural of the power CO.
- **Conclusion**
  - While these solutions do not address all the past trouble issues encountered by Mr. Ferebee, they should significantly improve the reliability of the Go-Digital system that currently serves Mr. Ferebee.

CenturyLink took these recommended actions at a materials cost of \$19,656.36 in equipment and 178 hours in technician time for a total cost of nearly \$35,000. These actions appear to have successfully addressed the vulnerability of the system to lightning strikes. On March 1, 2016 lightning struck the system. The grounding system worked exactly as it was supposed to work, and the service was restored within three hours of when trouble was reported.

Service will never work perfectly in an area with very challenging weather conditions, challenging geology and remote plant that is difficult to access. However, CenturyLink has taken the following steps:

- Assigned a specific technician to the area who the customers can contact directly;
- Brought in out of state specialists to recommend the best methods for reducing the vulnerability of this plant
- Implemented every recommendation for improving the ability of its plant to withstand its extreme environment at an expense of approximately \$35,000.

These steps have reduced the number of outages experienced by these customers, and allowed the outages to be repaired quickly when they do occur. The parties recommend that the Commission:

1. Find that the complaint has been satisfied by the actions CenturyLink has taken.
2. For a period of one year order CenturyLink to:

- a. Continue to have a technician assigned to this area and make sure the customer has the ability to contact that technician directly;
- b. Notify the Commission of any outages as soon as it is practical to do so;
- c. Provide a report in 6 months regarding any outages or service issues experienced by the customer.