ATTACHMENT A

WASHINGTON
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UTILITIES AND TRANSPORTATION
COMMISSION

Investigation Report

CenturyTel of Inter Island d/b/a CenturyLink

UT-132234

Staff Investigation
Consumer Protection
Regulatory Services

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PURPOSE, SCOPE, AND AUTHORITY

Purpose
The purpose of this investigation is to determine whether CenturyTel of Inter Island d/b/a CenturyLink (CenturyLink) complied with Utilities and Transportation Commission (commission) laws and rules during a ten day service outage that began Nov. 5, 2013, when an underwater fiber failure caused toll and data outages in San Juan County, and whether commission staff should recommend penalties for any violations of laws or rules.

Scope
The scope of this investigation focuses on CenturyLink's business practices prior to, during, and immediately following the outage.

Authority
Staff undertakes this investigation pursuant to Revised Code of Washington (RCW) 80.01.040 and 80.04.070, which grant the commission authority to conduct such an investigation, as well as RCW 80.04.380, which authorizes the commission to penalize public service companies for violations of commission rules and other requirements.

Note: this report presents the findings of a commission staff investigation and staff's recommendations for action by the three-member commission in a subsequent proceeding. This report has not been reviewed formally by the commissioners. Conclusions and recommendations contained in this report are those of commission staff, and not the commissioners.

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EXECUTIVE SUMMARY

Beginning early on the morning of Nov. 5, 2013, CenturyLink experienced a voice and data outage in the San Juan Islands when an underwater fiber segment of the company's system was severed, which isolated the host switch in Friday Harbor from the remainder of the network.

The outage resulted in a loss of toll calls, data communications, and local calls on San Juan, Lopez, Orcas, Blakely, Decatur, and Shaw Islands, and between those islands and the mainland. Approximately 5,800 access lines on San Juan Island retained intra-island calling ability. Following considerable efforts and incremental restoration, CenturyLink fully restored service on Nov. 15, 2013. The outage affected a total of 15,921 regulated access lines.

Commission staff initiated an investigation on Dec. 6, 2013. On Dec. 9, the commission held a public hearing in Friday Harbor to hear from the Company, as well as from local customers and government agencies. Representatives from the San Juan County Department of Emergency Management, San Juan Fire Service, Orcas Power and Light Cooperative (OPALCO), San Juan Chamber of Commerce, and local businesses expressed dissatisfaction with CenturyLink's infrastructure, equipment, and service; communication during and immediately following the outage; and the service restoral timeframe.

Subsequent to the hearing, commission staff undertook further investigation to:

- Determine what caused the outage;
- Evaluate CenturyLink's restoration efforts;
- Evaluate CenturyLink's communications with affected customers during the outage; and
- Determine the extent to which CenturyLink's facilities in the San Juan Islands were adequate to provide service as required by state law.

Staff worked with an outside consultant, Robert Munoz, Undersea Cable Consultants, LLC, to assist in the investigation of the cause of the outage and evaluate the company's restoration efforts. Mr. Munoz's full report is attached as Appendix J.

As a result of this investigation, staff concluded that CenturyLink violated the following laws and commission rules:

- WAC 480-120-412(2), Major Outages – Notification to the commission
- WAC 480-120-412(3), Major Outages – Notification to county E911 coordinator
- WAC 480-120-412(5), Major Outages – Dissemination of information to the public

Staff also concluded that, given the circumstances, CenturyLink was fortunate to have restored service in just 10 days. Finally, after investigating the national standards in the telecommunications industry for providing service to island communities, staff was unable to conclude that CenturyLink's facilities were inadequate compared to similar facilities around the country.

Following the outage, CenturyLink replaced the severed undersea cable and committed to installing a microwave system to ensure backup service in the event of future disruptions. That installation is currently underway.

Penalty Recommendation
Staff recommends the commission issue a formal complaint against the company and assess a penalty of up to $173,210 for 15,935 violations of commission laws and rules, as follows:

- Up to $3,000 for three violations of WAC 480-120-412(2) for failing to promptly notify the commission of the outage.
- Up to $10,000 for ten violations of WAC 480-120-412(3) for failing to immediately notify the county E911 coordinator of the outage and provide periodic updates.
- Up to $1,000 for one violation of WAC 480-120-412(5) for failing to implement procedures specific to this outage to disseminate information to the public and public officials.
- $10 for each of 15,921 violations of WAC 480-120-412(5) for failing to disseminate information to the public, for a total penalty of $159,210.

Technical Recommendations
To limit the impact of future outages, staff recommends the commission require CenturyLink to do each of the following:

- Notify the commission when each microwave system's spectrum has been approved by both the Federal Communications Commission and Canadian authorities.[1]
- Notify the commission when both microwave systems are suitable for providing service.
- Submit an annual maintenance plan to the commission specifying, at a minimum, the microwave facilities to be inspected and the frequency and manner in which inspections are conducted.
- Report annually to the commission that both San Juan microwave systems are able to provide redundant capacity to island customers.
- Report annually to the commission any routine maintenance performed during the preceding year for both the underwater fiber cable and microwave systems.
- Require the company to petition the commission for approval of any company plans to modify or eliminate redundant service between the islands and from the islands to the mainland.
- By Nov. 30 each year, submit proposed annual inspection plans for the subsequent calendar year for all underwater facilities in Washington owned by CenturyLink that connect a community to the public switched network. The plans should, at a minimum, specify the location of the facility to be inspected and the frequency and manner in which inspections are conducted.

[1]Because of its proximity to the U.S.-Canadian border, both the FCC and Canadian authorities must approve the Mount Constitution to Bellingham route.

- By March 31 each year, submit an annual report to the commission describing the actual inspections conducted in the preceding calendar year.

Report Format

This investigation report is divided into four sections. The first section provides background information about the company and the investigation. The second section describes the network and discusses findings related to the cause and restoral of the outage. The third section discusses findings related to CenturyLink's communications with commission staff, local government, and affected customers during the outage. Staff's recommendations appear in the last section.

BACKGROUND

Company Information

CenturyTel of Inter Island d/b/a CenturyLink is an incumbent Local Exchange Carrier (LEC) in the San Juan Islands, incorporated in the state of Washington and owned by CenturyTel of the Northwest. CenturyTel of the Northwest is owned by CenturyLink Holdings, which is in turn owned by CenturyLink, Inc. On March 14, 2011, the commission issued Final Order 14 in Docket UT-100820, approving and adopting, subject to conditions, a multiparty settlement agreement authorizing CenturyLink, Inc. to acquire indirect control of Qwest Corporation, Qwest LD Corp. and Qwest Communications Company LLC.

Investigation

Following CenturyLink's November 2013 voice and data outage in the San Juan Islands, commission staff initiated this investigation to determine whether the company complied with commission laws and rules. On Dec. 6, 2013, Regulatory Services staff sent a series of data requests to CenturyLink inquiring about the make and manufacturer of the severed fiber optic cable, placement of the cable, pre-existing or past damage to the cable, maintenance of the cable, metrics for measuring network reliability, and information about whether CenturyLink had or has service agreements with OPALCO for assistance in the event of a network outage.[2] Staff issued follow up data requests on Jan. 8, 2014, and Feb. 28, 2014.[3]

On Jan. 6, 2014, Consumer Protection staff requested the following information from CenturyLink related to the service outage:

1. The number of affected customers, identified by island, customer type (commercial or residential), and CenturyLink services affected.
2. A chronology of all internal communications related to the outages, including summaries of phone calls and copies of any emails or other written correspondence.
3. A chronology of all communications with stakeholders related to the outages (such as commission staff, other federal, state, county, and local governments), including summaries of phone calls and copies of any emails or other written correspondence.
4. A chronology of service restoral by location, number of customers, and service type.
5. Information about whether CenturyLink had a communication plan in place.
6. Information regarding plans for communicating with stakeholders during future outages.
7. CenturyLink's plans to provide bill credits to the customers who the missed service during the outage.

On Jan. 21, CenturyLink provided responsive information to all but item 2, above. On March 4, CenturyLink produced the remaining responsive documents and information.

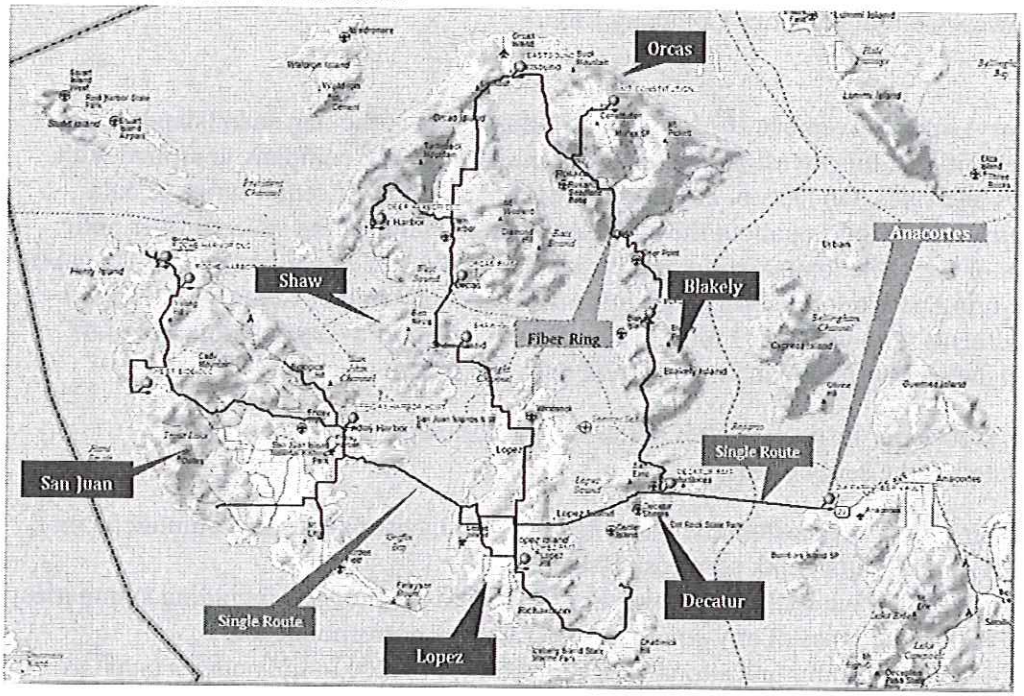
[2] See Appendix A for a copy of the Dec. 6, 2013, data request.

[3] See Appendix B for a copy of the Jan. 8, 2014, data request, and Appendix C for a copy of the Feb. 28, 2014, data request.

INVESTIGATION – NETWORK DESCRIPTION, OUTAGE, AND RESTORAL

Network Description

CenturyLink provides voice services in the San Juan Islands through one central office host switch (located in Friday Harbor on San Juan Island) and a number of remote line switches[4] connected by underground and submarine fiber optic links. The map below, prepared by CenturyLink and modified by staff, illustrates the network that provides voice, E911, and data services to the San Juan Islands.



Long distance calling and E911 services require a connection between the central office host switch in Friday Harbor (located on San Juan Island) and the remote line switches located on the other islands. The two fuchsia flags identified as "single route" on the chart above represent the two connections that, if severed, would isolate the central office host switch in Friday Harbor.

The submarine fiber optic cables have been installed over time, as follows:

- The link from Anacortes through Decatur Island to Lopez Island was installed in 1984.
- The link from Shaw Island to Lopez Island was installed in 1985.
- The link from Orcas Island to Shaw Island was installed in 1986.
- The link from Blakely Island to Orcas Island was installed in 1986.
- The link from Decatur Island is also linked to Blakely Island, and was installed in 1988.

[4] A remote line switch aggregates calls for the customers it serves. The switch is capable of processing local calls between customers connected to the switch. Other types of calls such as long distance, E911, or customers not connected to the remote line concentrator will be sent to the host switch (Friday Harbor) for processing.

- The link from Lopez Island to San Juan Island was installed in 1999 and replaced in 2013.[5]

The original CenturyLink "MF48" submarine cable replaced an analog microwave route from the islands to the mainland. It was built by Pirelli Jacobsen, an underwater fiber contractor, in 1999. Harbor Offshore, Inc., laid the last fiber link from Anacortes to Decatur Island in 2004, completing the company's fiber route for its San Juan Islands customers to the mainland. The Pirelli single-armored submarine cable consists of 48 glass optical fibers embedded within a hermetically sealed copper tube. Inside the tube, the 48 fibers are contained in a helical slotted plastic rod extruded around a high strength steel wire. The copper tube is covered by a polyethylene sheath. Outside the polyethylene sheath, there is a layer of galvanized steel wires that provide mechanical protection. The wires are then wrapped with a thick layer of polypropylene yarn, and subsequently wrapped with jute. The Pirelli submarine cable is similar to other non-repeated[6] optical submarine cables in use around the world today for shallow water applications, and it meets international standards.[7]

Network Outage

On Nov. 5, 2013, CenturyLink experienced a voice and data outage in the San Juan Islands when a fiber segment of the company's system connecting Lopez Island to the main switch on San Juan Island was severed.

During the failure, CenturyLink customers on Orcas, Decatur, and Lopez Islands had access to local intra-island service, but were unable to contact other islands until Nov. 7, 2013. Because of the loss of connectivity to the Friday Harbor central office host switch on San Juan Island, customers on those islands had no access to long distance calling and could not reach 911 for emergency services. Before basic 911 service was restored on Nov. 7, CenturyLink issued a press release instructing its customers to call their local fire department in the event of an emergency. CenturyLink customers on San Juan Island could make basic 911 calls, but had no access to inter-island calling or long-distance service. Limited Internet service was available on all islands except San Juan. The outage partially impacted cellular service provided by unaffiliated carriers.

[5] Decatur, Blakely, Orcas, Shaw, and Lopez Islands are connected via a self-healing fiber ring. A self-healing ring has the ability to automatically reroute the calls if there is a disruption in service on the primary route (e.g., the primary route for Blakely Island would send calls north to Orcas Island). For example, if this fiber link was severed, those calls would automatically reroute to Orcas in the other direction on the ring (through Decatur).

[6] Fiber Optic repeaters are generally required for fiber optic facilities that are longer than 28 miles. None of the fiber links in the San Juan are long enough to require the signal to be repeated.

[7] International Telecommunications Union (ITU) Recommendation G.973 and Optical Fibres, Cables and Systems Manual (ITU T Manual 2009.)

The fiber link connection where the failure occurred follows a corridor specified by the Washington State Department of Natural Resources (DNR) between Lopez and San Juan Islands. A power cable owned by OPALCO also lies within the DNR cable crossing corridor, which is clearly marked on marine charts as a cable crossing. The company's contractor, Harbor Offshore, used a remotely operated underwater vehicle to inspect the CenturyLink fiber optic cable and found that it had been moved or dragged north from its original position and pulled tight up against a rock feature.[8]

On Nov. 4, 2013, at 8:05 p.m., the ebb current ran south at 4.02 knots; it changed to a strong flood with a north-running current at 4.53 knots on Nov. 5 at 2:46 a.m., about one hour before the network failure was noticed at 3:45 a.m. It is possible that the cable suffered earlier damage and the subsequent tidal movement severed the cable. When staff and consultant Mr. Munoz later viewed the failed section at the company warehouse in Gig Harbor, it appeared that the cable had been severed, rather than abraded, from tidal movement.[9]

CenturyLink personnel contacted the U.S. Coast Guard and the Washington Department of Fish and Wildlife requesting any information they had concerning vessels in the area on Nov. 5. Neither entity was aware of any vessels in the area. Mr. Munoz also performed a search of historical vessel data at the time of the failure and found that a research vessel, the R/V Centennial, owned and operated by the University of Washington, passed over the cable on its regular schedule on Oct. 9, 15, 22, and 29, 2013.[10] Staff requested from the university information concerning the vessel's activities at that time, and copies of the vessel's sailing log. The university provided a copy of the log on June 11, 2014. While the log only provided information on the vessel's departure and arrival times at its dock at Friday Harbor, the cover letter explained that any research equipment the vessel drags through the water is delicate, and would break if it touched the bottom. Mr. Munoz could not identify any other definitive ship traffic in that area. Further discussions of other possible factors that may have contributed to the fiber break are contained in Mr. Munoz's report.[11]

Restoral

CenturyLink contracted with Harbor Offshore, Inc. to repair the failed fiber link. The contractor's dive team arrived at the San Juan Island site on Nov. 6, 2013, to begin making repairs. According to Mr. Munoz,

> "The cable service was restored in less than 10 days after the break, which is somewhat unusual for shallow water repairs. Shallow water repairs require specialized equipment such as a barge, navigation tools, cable chute, a powered cable reel and experienced repair personnel. A ROV (Remote Operated underwater Vehicle) was also on site to assist with locating the cable break and performing the repair. For all of these tools and resources to be available on such short notice is an achievement worth noting. It usually takes up to a month or

[8] Appendix J, page 5, paragraph 2, through page 6.
[9] Appendix J, page 15, paragraph 8.
[10] Appendix J, page 19, paragraph 8.3, through page 21.
[11] Appendix J, page 14, paragraph 8, through page 19.

more to mobilize the necessary tools and resources for a shallow water repair."[12]

CenturyLink located a sufficient amount of spare submarine fiber cable at a company warehouse in Kent and purchased the appropriate splicing equipment from Waveguide, Inc. in Seattle. CenturyLink has since restocked spare cable and supplies.

According to Mr. Munoz, even with the right equipment and crew in place, finding and fixing the cable was difficult. The month of November was stormy, and high winds in the San Juan Islands made it difficult to use the ROV and barge. Additionally, in the San Juan Channel at Griffin Bay between San Juan and Lopez Islands, the tidal current— which changes every six hours mostly running north and south— sometimes runs above four knots. The company reported that current and wind made it very difficult to keep the barge on station so that the ROV could "swim" the cable to find the fault. Also, when an "armored" submarine splits, it recoils from the tensile pressure of the metal armor moving the ends from the original position, and the ends of the severed cable may be moved even farther by the current. Once Harbor Offshore found the ends of the failed cable it needed tractor tugs to "hold station" within a three-foot window to bring one end of the existing cable to the surface, splice it to a new section of cable, and lower the repaired cable to the seabed.

Mr. Munoz stated,

> "Cable repair operations commenced with the recovery of the parted western end of the cable. Once sufficient cable had been recovered beyond any damaged cable and water ingress, the Western end of the cable was cut and prepared for splicing. The western end of the cable was spliced to a section of spare cable, and once the splice was completed, the repair barge began laying spare cable eastward towards Fishermen Bay landing. The cable repair was completed with a new shore landing at Fishermen Bay." [13]

When the new 6,100 foot cable was spliced to the undamaged portion of the remaining cable, the repaired cable was lowered to the seabed and anchored to the bottom using large heavy portions of chain to restrict potential tidal movement. The cable was rerouted away from an existing rock pinnacle, which may have been a factor in the failure.

Service was fully restored on Nov. 15, 2013. Both Mr. Munoz and CenturyLink's repair contractor stated that the repair of the fiber cable was accomplished in a short period of time because of the availability of the necessary equipment and qualified personnel.[14] They also agreed it is not unusual for an underwater repair to take longer than 30 days.

Service Restoral Timeline

The following table, submitted by CenturyLink in response to staff's data requests, details the service restoration chronology.

[12] Appendix J, page 10, paragraph 2.
[13] Appendix J, page 7, paragraph 2.
[14] Appendix J, page 26, paragraph 11.

Date	Time	Voice Service Impact
11/05/13	0345	Voice monitoring systems detect loss of connection to Friday Harbor switch. Approximately 11,000 voice customers are impacted. About 5,800 on have intra-island calling capability on San Juan Island. The remaining 5,200 on other islands have no voice calling capability over the CenturyLink network – some cellular service is still working.
11/05/13	0815	911 service re-routed to local law enforcement on San Juan Island. (Approximately 5800 voice connections).
11/05/13	0926	911 service re-routed to local law enforcement on Orcas Island. (Approximately 4200 voice connections).
11/05/13	1555	It becomes clear that the cause of the trouble is under water.
11/06/13	1340	Dive team arrives on location. Weather and unexpectedly strong currents would hamper search for cable damage over the next several days.
11/06/13	1750	CenturyLink and OPALCO complete a fiber connection in preparation for partial restoration of service over radio. Minimal change in service impact.
11/07/13	1301	CenturyLink authorizes Verizon to use space on its Radio tower to partially restore Verizon cellular service.
11/07/13	2359	Inter-island calling restored on Lopez and Orcas islands. 911 re-routed to San Juan County Sherriff's office on San Juan Island. ANI/ALI service not yet available for 911. Almost all voice customers now have intra and inter-island calling capability.
11/08/13	2022	Toll service (outside the islands) calling partially restored. All voice customers have the capability to call outside the islands, but capacity is limited.
11/09/13	0925	Some special service circuits for cellular carriers and other large business customers are restored.
11/09/13	2108	911 ANI/ALI enabled – 911 operations normal.
11/11/13	1729	Fiber damage located with Remotely Operated Vehicle.
11/11/13	1739	Confirmed all FAA service restored. Voicemail restored.
11/12/13-11/14/13		Isolated outages with relatively short durations occur as CenturyLink works to add additional capacity.
11/15/13	0930	Service is 100% restored.

On the date of the failure, the San Juan Islands had a single connection to the outside world from the Friday Harbor central office host switch. The lack of multiple physical routes between the main switch at Friday Harbor and the rest of the islands' networks, coupled with the main switch's lack of multiple physical routes to the mainland, contributed to the company's inability to offer uninterrupted service.

Following the repair of the severed undersea cable, two portions of the network without multiple routes remain, and the loss of either would result in the same situation experienced during the outage on Nov. 5. The single route links are as follows:

1. The submarine fiber optic link between Anacortes and Lopez Islands (via Decatur Island) compose the single connection to the mainland, and its loss would isolate the islands. This link crosses Rosario Strait, an extremely busy shipping lane. Any repair in this location would be complicated by restrictions for working in the middle of that shipping lane.
2. The submarine fiber optic link between Lopez Island and San Juan Island isolates the host Friday Harbor central office switch from the outside world and the other inter-island remotes.

In order to provide continuous voice and 911 service among the San Juan Islands and between the San Juan Islands and the rest of the national network, CenturyLink has committed to installing two digital microwave systems. The first supports voice and 911 service between the islands, and the second establishes a connection from Friday Harbor to Bellingham via Mt. Constitution, which, pending completion, will support commission-regulated services such as E911 and voice calling between the San Juan islands and the rest of the national network in the event the undersea cables fail.[15] These microwave systems are estimated to cost about $500,000, not including ongoing maintenance and tower leasing costs.

In addition to the construction of the microwave networks, CenturyLink is also actively seeking an agreement for capacity sharing with another fiber provider in the San Juan Islands. This agreement would provide redundancy for 100 percent of its voice and data traffic – both regulated and non-regulated services – to its San Juan Island customers.

State Network Requirements

Washington law requires telecommunications companies to provide services "in a prompt, expeditious and efficient manner … and … service shall be modern, adequate, sufficient and efficient."[16] Neither the law nor Commission rules define what constitutes "modern, adequate, sufficient and efficient" service. More specifically, Commission rules do not currently require telecommunications companies to provide multiple physical routes between a company's switching centers, or to the broader national telecommunications network.

In this case, whether service is "modern, adequate, sufficient and efficient" can be determined by looking at the common practices throughout the telecommunications industry. Accordingly, staff sought information from other jurisdictions in North America with island communities to determine whether those jurisdictions have laws or rules requiring multiple physical routes between switching centers, or to the broader national telecommunications network.

At staff's request, the National Association of Regulatory Utility Commissions (NARUC) distributed a survey to members of its telecommunications committee. It received responses from New York, Georgia, Arkansas, New Mexico, Iowa, Wisconsin, Michigan, Pennsylvania, and Texas. None of these states have rules requiring telecommunications companies to provide multiple physical routes between a company's switching centers or to the broader national network. In addition to the NARUC survey, staff independently contacted Maine, North Carolina, South Carolina, Georgia, Florida, California, Oregon, Alaska, and the Canadian provinces of Nova Scotia and British Columbia. Like those states that responded to the NARUC survey, none of these jurisdictions require multiple physical routes between switching centers or to the broader network.

Major Outages

Staff reviewed CenturyLink's recovery effort to determine whether the company complied with WAC 480-120-412(1), Major Outages, which provides as follows:

[15] Although the Commission does not have direct authority over CenturyLink's provision of broadband (internet) services, staff understands that the microwave system will also be used for backup or redundancy purposes in support of some of the company's broadband service offerings traveling via microwave to Bellingham.
[16] RCW 80.36.080

> All companies must make reasonable provisions to minimize the effects of major outages, including those caused by force majeure, and inform and train pertinent employees to prevent or minimize interruption or impairment of service.

Today's telecommunications companies provide an array of voice and data services, and outages potentially affect businesses, banking, medical services, and other essential activities. While a normal landline cable repair can be completed in hours, not days, the repair of an underwater fiber cable is extremely complex and time consuming.

Staff's investigation determined the company had sufficient materials on hand to repair the fiber, and its employees were adequately trained to locate the break and engage qualified contractors to repair the cable. Staff believes the company took the necessary steps to comply with the Major Outages rule; repairing an underwater cable damaged at a depth of approximately 280 feet on a seabed floor could have taken substantially longer to repair given the complex environment.

Staff supports the company's efforts to install redundant systems, and believes CenturyLink should additionally seek a capacity sharing agreement with OPALCO to ensure each company has redundant routes to the mainland. This option would give CenturyLink a third redundant route, allowing the company to transport all of its voice and data traffic to the mainland in the event of an outage.

INVESTIGATION – COMMUNICATION DURING THE OUTAGE

Public Hearing

As part of this investigation, the commission held a public hearing on Dec. 9, 2013, in Friday Harbor. A number of local government officials and business owners spoke about the outage and provided feedback related to CenturyLink's responsiveness and restoration efforts. Consumers also expressed concerns about the company's infrastructure and lack of redundancy.

The following themes emerged during the public comment hearing:

1. The serious financial consequences the outage had on local businesses;
2. CenturyLink's failure to communicate adequately with affected customers; and
3. The company's lack of redundancy and reliable infrastructure.

External Communication during the Outage

The following table, submitted by CenturyLink in response to staff's data request, contains a chronology of the company's communications with external stakeholders during the outage.

Date	Time	Topic	Reach
11/05/13	Not provided	"A fiber optic cable has been cut underwater between Lopez and San Juan Islands impacting CenturyLink Services, including 911 services, throughout the islands; 911 services on San Juan Island have been rerouted to the local 911 center."	Local and Regional media
11/05/13	Not provided	- Outage notifications sent to the commission. - Coast Guard from operations department inquiring about vessel traffic in the area at the time of the breakage; no traffic was identified during that time period by the Coast Guard, but they did not rule out the possibility of private fishing vessels with no GPS equipment. - Multiple communications with OPALCO.	N/A
11/06/13	Not provided	"CenturyLink is working with Orcas Power & Light Cooperative (OPALCO) to provide a temporary solution that would restore local voice and 911 services for customers on San Juan, Orcas, and Lopez Islands."	Local and Regional media
11/06/13	Not provided	- Coast Guard to CenturyLink operations reporting lack of vessel activity in the area of the cable breakage on Nov. 5. - OPALCO to CenturyLink Construction Engineering re: emergency circuit configuration. - OPALCO to network planners re: emergency workload logistics. - CenturyLink Network Operations to Verizon requesting any available radio/microwave capabilities to assist in restoral.	N/A
11/07/13	Not provided	"CenturyLink crews restored 911 and local phone service between Lopez and San Juan Island last night at 11:59 p.m. 911 has been rerouted to the San Juan County Sheriff's office in Friday Harbor."	Local and Regional media
11/07/13	Not provided	- E911 IT Program/Operations Manager to commission and CenturyLink Public Policy describing short and long term effects of restoration project. CenturyLink Public Policy to government officials forwarding the short and long term efforts on the restoration project. - Commission staff forwarding an email from E911 Operations to CenturyLink Public Policy and Legal informing that dial tone has been restored. - Commission staff to CenturyLink Public Policy informing that staff received notification from the Washington Military Department regarding the CenturyLink San Juan Island outage.	N/A

Date	Time	Topic	Reach
11/08/13	Not provided	"CenturyLink crews restored 911 and local phone service between Lopez and San Juan Islands Wednesday, Nov. 6, at 11:59 p.m. 911 has been rerouted to the San Juan County Sheriff's office in Friday Harbor."	Local and Regional media
11/08/13	Not provided	- OPALCO to CenturyLink Operations explaining that OPALCO will seek to recover damages from CenturyLink should any damages to OPALCO services result from CenturyLink recovery efforts. - CenturyLink Public Policy to commission providing a detailed update on the San Juan outage and restoration efforts. FCC Operations at Homeland Security to CenturyLink Engineering granting the Special Temporary Authority. Commission staff to CenturyLink Operations and Public Policy requesting an understanding of how the network is configured in the San Juans. - Seattle Times to CenturyLink Marketing requesting information to report on the cable break. - OPALCO to CenturyLink Engineering giving summary of week's progress. - Commission to CenturyLink Operations and Public Policy requesting information on how the network is configured in the San Juans. - Emails among commission staff, 911 Operations Manager and restoration team discussing status of 911 on the islands.	N/A
11/09/13	Not provided	"Overnight, CenturyLink crews restored long distance service throughout San Juan County. CenturyLink and OPALCO continued to work through the night to restore internet service to San Juan island."	Local and Regional media
11/09/13	Not provided	Harbor Offshore[17] to CenturyLink confirming 5 cables sighted; described as damaged cable, bird caged armor, with football shaped weights. CenturyLink network to ADTRAN[18] discussing the order of products necessary for repairs.	N/A
11/10/13	11:36 a.m.	"Services have been temporarily restored to the San Juan Islands."	Local and Regional media
11/10/13	10:38 p.m.	"CenturyLink is working around the clock to restore communications."	Local and Regional media
11/11/13	Midnight	"CenturyLink is working around the clock to restore communications."	Statewide media via newswire; local distribution and CL social media
11/11/13	6:26 p.m.	"CenturyLink severed fiber located: company continues massive effort to repair cable, restore service."	Statewide media via newswire and local distribution and CenturyLink social media
11/12/13	9:35 a.m.	"CenturyLink restoration efforts on the barge are temporarily suspended due to inclement weather and 40 knot winds."	Local and Regional media
11/12/13	11:27 a.m.	"Currently, CenturyLink is experiencing an outage on Orcas Island that is impacting 911 and voice services."	Local and Regional media

[17] Harbor Offshore is the Marine contractor that located and replaced the broken cable.
[18] ADTRAN is a telecommunications vendor.

Date	Time	Topic	Reach
11/12/13	Not provided	- Commission staff to CenturyLink Public Policy, Legal, and additional commission staff forwarding a complaint email from Rock Island Technology Solutions. Commission Staff to CenturyLink Public Policy requesting that Public Policy contact San Juan County Emergency Management re: outage update, media questions. - Commission staff to CenturyLink Public Policy forwarding email from San Juan County Emergency Management exploring alternative solutions for additional bandwidth.	N/A
11/13/13	10:22 a.m.	"The outage that was reported on Orcas Island on 11/12 was caused by call volumes exceeding capacity."	Local and Regional media
11/13/13	4:42 p.m.	"CenturyLink is experiencing an outage impacting voice communication services on the islands starting at approx. 3:59 p.m. on Wednesday, 11/13. This outage is not due to capacity, but adding additional equipment to augment the network."	Local and Regional media
11/13/13	8:24 p.m.	"As previously messaged, CenturyLink experienced voice communication outages earlier this afternoon, services were restored for the majority of residents at 5:10 p.m. CenturyLink continued to monitor issues with a small number of customers until 8 p.m. this evening on Lopez and Orcas Islands."	Local and Regional media
11/13/13	Not provided	"Orcas Island, Wash. – CenturyLink will be hosting a public forum to address any concerns from customers regarding the underwater fiber cut."	
11/13/13	Not provided	- San Juan County Emergency Management to CenturyLink, State and Federal elected officials, and local government facilitating a conference call to update the public on restoration efforts. - CenturyLink Public Policy and Marketing from San Juan County Emergency Management proposing new agenda for daily update calls. - Commission staff to CenturyLink Public Policy inquiring how much the outage will cost CenturyLink. - CenturyLink Public Policy to Senator Ranker informing him of the FCC request for Special Temporary Authority for a microwave radio pass in the 11 GHz band. - Commission staff to CenturyLink Public Policy and additional commission staff attaching emergency declaration. - CenturyLink Public Policy to commission staff discussing general estimate of projected costs to CenturyLink on the outage. - San Juan Journal to CenturyLink Marketing and Operations asking for clarification of cable replacement and backup system. - Construction Engineering to OPALCO concerning possible issues with fiber on the OPALCO-CTL cross connect.	
11/14/13	11:34 a.m.	"CenturyLink services may experience intermittent disruptions throughout the day in voice, 911, and data services as we continue with the restoration effort."	Local and Regional media
11/14/13	Not provided	- San Juan County Department of Emergency Management to elected officials and local government providing contact information for CenturyLink. - CenturyLink marketing to parties affected by outage, including department of emergency management and local government officials. - Updates from CenturyLink Construction Management regarding submarine cable repair work.	N/A
11/15/13	Not provided	"CenturyLink crews restored services, including all voice and high-speed internet, to the San Juan Islands this morning. Crews worked overnight in the rain to connect the new fiber that was laid yesterday."	Statewide media via newswire and local distribution and CenturyLink social media

Date	Time	Topic	Reach
11/15/13	11:01 a.m.	"Lopez Island, Wash. – CenturyLink will be hosting a public forum to update residents on the progress of the underwater fiber restoration."	Local and Regional media
11/15/13	Not provided	- San Juan County Emergency Department to CenturyLink thanking CenturyLink for restoration efforts and concerns going forward. - CenturyLink operations and marketing updating a reporter at the San Juan Journal. - OPALCO legal to CenturyLink team requesting review and signatures on master service agreement.	N/A
11/20/13	5:17 p.m.	"Because of the recent outage caused by the undersea fiber optic cable cut, CenturyLink is actively working on a solution for out of service adjustments."	Local and Regional media

Communication with Commission Staff

CenturyLink's chronology notes that it provided an outage report to commission staff on Nov. 5, 2013. The report, received by staff at 3:47 a.m., described the outage as follows: "5831 lines impacted due to toll isolation. Possible maintenance activity."[19] The notice gave an estimated restoral time of 8 a.m. that same morning. Subsequent to the company's report, the Military Department's State Emergency Operations Officer notified Staff that the outage was far more extensive and was likely due to a severed fiber cable. The Military Department invited Regulatory Services staff to participate in conference calls with CenturyLink on Nov. 6 at 10:30 a.m. and Nov. 7 at 10 a.m. CenturyLink's first official communication with Staff about the nature and extent of the outage came on Friday, Nov. 8, 2013, in an email from Mark Reynolds, NW Regional Vice President.[20] In his email, Mr. Reynolds explained the company's lack of communication as follows:

> "Notice was made to the WUTC via our standard notice process on 11/5. Rebecca [Beaton, Regulatory Services] and I agree that with such a major event, the WUTC needs to be linked into all information dissemination. I assumed that the notification of subsequent meetings of the emergency management agencies included the WUTC. Obviously that was not a good assumption and I take full responsibility for not reaching out to WUTC to ensure it was in the loop. I apologize for the inconvenience and commit to making immediate contact when future events arise."

WAC 480-120-412(2), Major Outages, provides that: "When a company receives notice of or detects a major outage, it must notify the commission and any PSAP serving the affected area as soon as possible." The outage report submitted by CenturyLink on the morning of Nov. 5 did not describe a major outage; it described a toll restriction due to "possible maintenance" that was expected to be restored within hours. CenturyLink's first official communication with commission staff about the nature and extent of the outage came from the aforementioned email from Mr. Reynolds.

[19] See Appendix D for a copy of the Nov. 5, 2013, outage notification email sent to commission staff.
[20] See Appendix E for a copy of the Nov. 8, 2013, email from Mark Reynolds to commission staff.

CenturyLink's failure to comply with WAC 480-120-412(2) and notify the commission directly of a major outage violates the rule for each day the company failed to act. Because the Company identified the cause of the outage on the afternoon of Nov. 5, staff finds three violations of WAC 480-120-412(2) for Nov. 5, 6, and 7.

Communication with the PSAP and E911

Brendan Cowan, Director of San Juan County Department of Emergency Management, spoke at the Dec. 9 public hearing in Friday Harbor, where he expressed concern that his department was not directly notified of the outage until nearly 12 hours after it had occurred, and then only in response to an email Mr. Cowan sent to the company. For the San Juan Islands, the Department of Emergency Management serves as both the PSAP and the E911 coordinator. Mr. Cowan reported that at 3:03 p.m. on Nov. 5, 2013, "our office reached out to the mainland CenturyLink contacts, asking for information about a possible submarine cable break – that was news to us."[21] Because CenturyLink failed to communicate with the Department of Emergency Management, Mr. Cowan relied on unconfirmed reports in the local media and "an amateur radio volunteer who reported overhearing radio traffic indicating that the outage was due to a submarine cable break."[22]

Mr. Cowan sent the following email to CenturyLink on Nov. 5 at 3:03 p.m.:

> "As I assume you're aware, we're in the midst of a serious comms/911 outage in San Juan County. Initial reports were that it was an underground fiber line that was dug up and it would be repaired by 2pm, but now we're hearing rumors (not from CenturyLink) that it was actually an underwater cable and might be much longer, possibly days.
>
> So far, the information coming from CenturyLink about this has been non-existent or minimal. Calls and emails to Debbie Martinez, our local CenturyLink contact, have been unreturned. I understand that you're busy, but would really benefit from better information flow from your organization.
>
> We've long had an effective system in place where updates were emailed by CenturyLink to outage@sanjuandem.net and this automatically updated our key Emergency Response organizations. Since the personnel transition following the retirement of Bill Henikman, this has not happened."

On Nov. 5, 2014, At 3:13 p.m., both the Department of Emergency Management and State 911 were first officially notified by CenturyLink that, "We've had splicers working on the fiber cut since 1:30 p.m. today and hope to resolve this soon."[23]

[21] A recording of the public hearing is available at http://www.avcapture all.com/Sessions.aspx#session.f778517c-bfd9-41d6-8ffd-e15c25d9f6d8.
[22] See Appendix F for a copy of the Nov. 5, 2013, email from Brendan Cowan to Markus Volke at CenturyLink.
[23] See Appendix G for a copy of Mr. Volke's Nov. 5, 2013, reply to Mr. Cowan.

In addition to violating WAC 480-120-412(2) as it relates to notifying PSAPs "as soon as possible," CenturyLink's failure to immediately notify the San Juan County Department of Emergency Management violated WAC 480-120-412(3), which provides, "When a major outage affects any emergency response facility, a company must notify immediately the county E911 coordinator and the state emergency management authorities, and provide periodic updates on the status of the outage."

According to Mr. Cowan, "we never had clear information, it was always complicated." And according to Mr. Duncan, the Friday Harbor Town Administrator, "The information that was being passed down the line that we could pass on to our citizens was muddled at best." Staff believes the evidence provided by Mr. Cowan and Mr. Duncan supports a finding that CenturyLink violated WAC 480-120-412(3) by failing to provide meaningful periodic updates on the status of the outage for its duration. Each day of the outage constitutes a separate and distinct violation; between Nov. 5 and Nov. 15, CenturyLink violated the rule ten times.

Communication with Customers

WAC 480-120-412(5) provides that, in the event of a major outage, "all companies must implement procedures to disseminate information to the public, public officials, and news media. All companies must provide a statement about the major outage that includes the time, the cause, the general location and approximate number of affected access lines, and the anticipated duration."

At the commission's public hearing on Dec. 9, 2013, several consumers and public officials commented about the company's lack of communication during the outage. Bob Jarman, a San Juan County Council member, stated that, "The main issue we had with CenturyLink was communication, failure to get information out."

Duncan Wilson, Friday Harbor Town Administrator, commented that, "Somebody knew where the ships were, somebody knew where the divers were, somebody knew what was going on, and that information was not making it back to this island."

Paul Kamin, Manager, Eastsound Water Users Association, submitted a written comment, noting that, "CenturyLink was slow in releasing information about the outage and was completely dependent on media outlets to distribute their press releases …The lack of information added to the stress of the situation. I encourage the UTC to examine the timeline of this service outage in conjunction with the announcements that CenturyLink provided. San Juan County has no radio stations in the County, and there is no daily print media."

Sandra Green, from the Four Winds Camp, submitted the following written comments: "We need an emergency communication plan. What do we do, how do we find out what's going on – besides the jungle drums, which are not always accurate …The people in the islands understand about underwater cables and we know that equipment mainly breaks; just give us the information without the spin."

Connie Jones, of Canoe Island French Camp, submitted the following written comment: "My biggest complaint about CenturyLink and the phone/internet outage was the lack of communication with their clients. As a client of both internet and phone in Washington and Oregon, I was quite amazed that I never received an email or phone call from CenturyLink during or after the hiatus in service."

Rick McCoy, from Lopez Island Pharmacy, submitted the following written comments: "…when off-island health care providers tried to call us we later found out that they were told that the numbers were disconnected. First this cost us revenue and second some of those calling thought we were out of business, a perception that someone who calls us infrequently still might have … a more specific automated answer needs to be implemented, something that outlines the problem to the caller in exact terms … [and] a more widespread notice to local broadcast media and others on the problem, as well as blast email at least to CenturyLink subscribers."

Roger Sherman, of Microsoft, submitted the following written comment: "In my opinion, CenturyLink should be severely penalized for its failure to provide basic communications services to this county. There is no excuse for lack of a backup. Failures like this are totally predictable except for the date of their occurrence. The response to this failure was also totally botched for lack of adequate planning."

Although CenturyLink issued daily news releases for the duration of the outage, the company failed to post information at its local Friday Harbor office or other physical locations throughout the islands, such as fire stations, schools, or grocery stores until "about the third day." At that point, CenturyLink posted its news releases "on the door of the central office located at 50 Second Street, Friday Harbor, and at Kings Market, the Post Office and Market Street Grocery."[24] Each of those locations is in Friday Harbor; nothing was posted at any location on the other affected islands.

In response to staff's data request for any existing communications plan, CenturyLink submitted a document entitled "Local Outage Procedures – Market Development Managers & Corporate Communications" that describes, in general terms, which personnel are authorized to speak with the media, what information should be collected, and external messaging.[25] The document describes generic procedures that are not at all specific to Washington or this outage. Staff therefore finds that CenturyLink failed to implement procedures specific to this outage to disseminate information to the public and public officials, as required by WAC 480-120-412(5). Additionally, CenturyLink's failure to communicate adequately with its customers during the outage constitutes 15,921 violations of WAC 480-120-412(5), one for each regulated access line affected by the outage.

Commission-Referred Consumer Complaints and Inquiries

Consumer protection staff received two complaints and two inquiries related to the outage. Two customers requested and received credits.

[24] See Appendix H for a copy of the May 6, 2014, email exchange between staff and CenturyLink.

[25] See Appendix I for a copy of the non-confidential version of the document entitled, "Local Outage Procedures – Market Development Managers & Corporate Communications."

RECOMMENDATIONS

Enforcement Authority and Policy

Staff typically recommends a "per violation" penalty against a regulated company where the violations result in serious consumer harm; for repeat violations of a rule after the company receives technical assistance; or for intentional violations of commission laws or rules. The commission has the authority to assess penalties of $100 per violation, per day against a regulated company without providing the opportunity for a hearing.[26] The commission also has the authority to assess penalties of up to $1,000 per violation, per day following a formal complaint and hearing.[27]

In this investigation, staff documented 15,935 violations of commission laws and rules, and recommends a penalty of up to $173,210. While the company restored service as soon as possible, staff believes the foreseeability of the outage – coupled with the company's lack of planning and poor communication with regulators, customers, and stakeholders during the outage – warrants a penalty of this size. While staff could recommend penalties of up to $1,000 per violation, to do so would be unduly punitive. Staff considered the following factors to determine the recommended penalty amount[28]:

1. **How serious or harmful the violation is to the public.**

   CenturyLink's equipment failure caused serious financial harm to customers and, because of 911 outages, could have resulted in fatalities. Business owners described significant revenue losses due to an inability to communicate with suppliers and customers; pharmacies were unable to communicate with doctors' offices to obtain necessary medication for patients; and residents could not communicate with family members off-island. The financial impact was significant, and could have been avoided if the company had installed redundancy or coordinated other backup planning in advance.

2. **Whether the violation is intentional.**

   Although the outage itself was unintentional, the evidence supports a finding that it was foreseeable. CenturyLink's lack of redundancy ensured that, in the event of a cable break, services would be lost indefinitely.

   Staff also believes the evidence supports a finding that while CenturyLink's poor communication with commission staff, E911, and its customers was unintentional, it was avoidable. Without a redundant system in place, the company knew or should have known that such an outage was inevitable, and therefore should have had procedures in place for notifying regulators and other stakeholders about the nature and extent of the outage, as well as the expected restoral timeframe.

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[26] RCW 80.04.405 allows the commission to assess an administrative penalty for any violation by a regulated company of a statute, rule, the company's own tariff, or commission order.
[27] RCW 80.04.380 allows the commission to assess a penalty of up to $1,000 for each violation following a hearing.
[28] Docket A-120061, Enforcement Policy for the Washington Utilities and Transportation Commission (January 7, 2013).

3. **Whether the company self-reported the violation.**

The company failed to report the outage to the commission until three days after it occurred, which violates commission rules.

4. **Whether the company was cooperative and responsive.**

Responses to Consumer Protection staff's data requests were delayed and incomplete. Otherwise, the company was cooperative and responsive during the investigation.

5. **Whether the company promptly corrected the violations and remedied the impacts.**

Given the circumstances, the company was fortunate to be able to restore service in a relatively short time, and has provided credits totaling $271,487.86 to affected customers.

6. **The number of violations and the number of customers affected.**

The outage affected 15,921 regulated access lines, and staff found a total of 15,935 violations.

7. **The likelihood of recurrence.**

Absent a redundant network, the likelihood of recurrence is very high. With redundancy, however, the likelihood of recurrence with respect the company's communication during an outage is contingent upon the company's plans and strategy going forward.

8. **The company's past performance regarding compliance, violations and penalties.**

In August 2008, staff reviewed 212 commission-referred consumer complaints filed against CenturyLink's predecessor company Qwest between Jan. 1 and June 30, 2008, to determine Qwest's compliance with rules and laws enforced by the commission. Staff found that Qwest violated 11 consumer protection laws and rules. Staff provided Qwest with a copy of the investigation report and met with company representatives to discuss the findings and provide technical assistance.

Staff performed a follow-up investigation in March 2010, using 102 consumer complaints filed against Qwest between March 1 and June 30, 2009. Despite the company's assurance of future compliance and the ongoing technical assistance provided through the commission's consumer complaint process, staff found violations of ten statutes and rules. Staff recommended the commission issue a formal complaint against Qwest for 69 violations of laws and rules enforced by the commission, and recommended a penalty of $69,000.

In March 2014, staff performed a subsequent follow-up investigation using 144 consumer complaints filed against Qwest and CenturyLink from Sept. 1, 2011, to Aug. 31, 2012. Staff found several repeat violations, and recommended the commission issue a formal complaint against the company and impose penalties of up to $313,000.

9. **The company's existing compliance program.**

   Staff is not aware of any existing compliance program.

10. **The size of the company.**

    The company reported total Washington intrastate operating revenues of $476,017,729 in 2013.

Penalty Recommendation
Staff recommends the commission issue a formal complaint against the company and assess a penalty of $173,210 for 15,935 violations of commission laws and rules, as follows:

- Up to $3,000 for three violations of WAC 480-120-412(2) for failing to promptly notify the commission of the outage.
- Up to $10,000 for ten violations of WAC 480-120-412(3) for failing to immediately notify the county E911 coordinator of the outage and provide periodic updates.
- Up to $1,000 for one violation of WAC 480-120-412(5) for failing to implement procedures specific to this outage to disseminate information to the public and public officials.
- $10 for each of 15,921 violations of WAC 480-120-412(5) for failing to disseminate information to the public, for a total penalty of $159,210.

Additionally, Staff recommends that CenturyLink closely review this report and the violations cited herein, which constitute technical assistance. Future violations will result in additional enforcement action, including penalties.

Technical Recommendations
To limit the impact of future outages, staff recommends the commission order CenturyLink to do each of the following:

- Notify the commission when each microwave system's spectrum has been approved by both the Federal Communications Commission and Canadian authorities.
- Notify the commission when both microwave systems are suitable for providing service.
- Submit an annual maintenance plan to the commission specifying, at a minimum, the microwave facilities to be inspected and the frequency and manner in which inspections are conducted.
- Report annually to the commission that both San Juan microwave systems are able to provide redundant capacity to island customers.
- Report annually to the commission any routine maintenance performed during the preceding year for both the underwater fiber cable and microwave systems.
- Require the company to petition the commission for approval of any company plans to modify or eliminate redundant service between the islands and from the islands to the mainland.
- By Nov. 30 each year, submit proposed annual inspection plans for the subsequent calendar year for all underwater facilities in Washington owned by CenturyLink that

connect a community to the public switched network. The plans should, at a minimum, specify the location of the facility to be inspected and the frequency and manner in which inspections are conducted.

- By March 31 each year, submit an annual report to the commission describing the actual inspections conducted in the preceding calendar year.

APPENDIX A

Investigation of the San Juan County CenturyLink Isolation

The following informal information requests are submitted to CenturyLink by the Washington Utilities and Transportation Staff regarding the outage in San Juan County caused by a fiber malfunction or cut on November 5, 2013. Staff requests the Company respond in 10 business days or notify Staff of the date the Company will respond if it cannot meet the requested deadline.

1.) What date was the underwater fiber optic cable placed into service for CenturyLink's San Juan County (SJC) islands from Anacortes to Lopez, San Juan, and Orcas Islands?
2.) Did Company employees design the fiber placement or was the design contracted to an external consulting firm? If the fiber placement was designed externally, what is the name and address of the consulting firm that fulfilled the contract?
3.) What company manufactured the fiber optic cable?
4.) Please provide the specifications of the fiber optic cable and attach any documentation of such specifications.
5.) What criteria were used to select the cable manufacturer? Please provide any documentation relating to these criteria.
6.) Since the placement of the CenturyLink SJC underwater fiber optic cable, has CenturyLink (or any predecessor Company) experienced any cuts or damage that may have affected service to San Juan County customers? If the answer is yes, please provide the following answers for each occurrence:
    a. An explanation of the damage to the fiber optic cable.
    b. Did the damage interrupt service to the customers?
    c. The date the damage occurred.
    d. A detailed description of the repair.
    e. Was the repair made by employees of the Company or an outside contractor?
7.) Has CenturyLink (or any predecessor company) replaced portions of the fiber optic cable? If the answer is yes, please provide the following answers for each occurrence:
    a. The date the replacement fiber optic cable was placed into service.
    b. The reason for the replacement of the cable.
    c. Did the replacement interrupt service?
    d. Please provide a map showing the replaced sections of the underwater fiber optic cable.
8.) Please provide a map showing the length of each section of the fiber optic cable (Anacortes to Lopez, Lopez to San Juan, etc.) and as much detail as is available on the depth of the fiber along each route.
9.) Is the underwater fiber optic cable marinized or is it a submarine cable?
10.) What was the original manufacturer's stated or estimated design life of the underwater fiber optic cable?
11.) If the manufacturer did not have a stated or estimated design life of the cable, what was the Company's estimated design life at the time the original fiber cable was placed into service?
12.) What is the Company's current end of life projection for the underwater fiber optic cable originally placed into service?
13.) Assuming the underwater fiber optic cable is beginning to reach its end of life projection, please give a detailed explanation the Company's replacement strategy e.g., would the Company replace the underwater fiber optic cable, how many years before the end of life projection, etc.

14.) Does the Company have a replacement strategy to prevent future disruptions of service to SJC due to unforeseen circumstances or deterioration due to age of the underwater fiber optic cable? If the answer is yes, please give a detailed explanation and provide any available relevant documentation.
15.) Does the Company intend to establish a redundant route to SJC to prevent service disruptions in the future? If the answer is yes, please give a detailed explanation e.g., the proposed bandwidth of the redundant facility, will it be able to transport all of the Company's voice and data traffic, and provide any other relevant documentation.
16.) Does the Company have a rapid response plan for outages caused by malfunction of this underwater fiber optic cable to minimize customer out of service time (e.g., spare lengths of underwater fiber optic cable or splice cases)? Please give a detailed explanation.
17.) Does CenturyLink have routine maintenance procedures for the San Juan County underwater fiber optic cable? If the answer is yes, please provide a detailed copy of those records.
18.) Does the number of failures on this CenturyLink underwater fiber optic cable service route comport with the expected reliability of a submarine fiber optic cable?
19.) Please give a detailed explanation of any routine maintenance and the date(s) the Company implemented that maintenance function on this cable.
20.) Does the Company have any underwater optical repeaters on this route?
21.) What was the cause of the November 2013 failure on the CenturyLink SJC underwater fiber optic cable (e.g., was it crushed, cut, or stretched, or did it fail due to normal aging?)
22.) Is the failed section of cable available to be viewed by Commission staff?
23.) Did the Company procure the replacement underwater fiber optic cable, splice cases, etc.? If the answer is yes, please list the items procured that were necessary to return the cable to service and list the vendor(s) that supplied the parts and the address of the vendor(s). Was a sub-contractor(s) used for the SJC cable repair? If any sub-contractor(s) was used, please list the name of the sub-contractor(s) and explain the work function they performed.
24.) Please provide a detailed narrative of the repair operation.
25.) What was the total cost of the SJC cable repair?
26.) Please provide the CenturyLink SJC "route position list".
27.) Please provide the original CenturyLink/PTI SJC route plan(s) (include the route survey information and any drawings of the route).
28.) Please provide copies of all permits related to the SJC fiber optic cable along with "as built" drawings.
29.) What standards were used for the original cable placement?
30.) Please identify the duration of the November 2013 CenturyLink SJC service interruption. Please includes the dates and times of the initial outage and when complete restoration of all services was accomplished.
31.) What metrics, if any, does CenturyLink use to measure network reliability (such as the Customer Average interruption Frequency Index (CAIFI), System Average Interruption Frequency Index (SAIFI) or Interruption Cost Estimate Calculator (ICE) or other such indicators)?
32.) Does CenturyLink have a mutual assistance agreement with Orcas Power and Light Cooperative (OPALCO) in SJC in the event of a network outage?
33.) Was the OPALCO assistance agreement to CenturyLink during the SJC outage developed prior to or during the November 2013 outage?
34.) Does CenturyLink have an established mutual agreement "going forward" with OPALCO?
35.) Does CenturyLink have any mutual agreements with any other utilities or similar providers serving San Juan County?

36.) Does CenturyLink have any other underwater fiber optic cable in its Washington network? If the answer is yes, please provide the following:
   a. Where is the cable located?
   b. What date was that cable placed into service?
   c. What type is the cable?
   d. Who is the manufacturer of the cable?
   e. How long is the cable?

37.) Does CenturyLink own any other shallow salt water fiber optic cable in its other Incumbent Local Exchange Carrier (ILEC) companies within the United States? If the answer is yes, please list the state where the fiber is located.

38.) Does CenturyLink maintain an inventory of underwater replacement equipment for all specialized underwater fiber optic cable in the state of Washington or does CenturyLink rely on supplies "on an as needed basis" from external vendors?

39.) If CenturyLink relies on vendors to supply the replacement equipment referenced in the informal information request immediately above, please give a detailed explanation of the agreement and attach any documentation of the agreement.

40.) Does CenturyLink have representation on the FCC's Security, Reliability, and Interoperability Council (CSRIC) and, if so, who are those representatives?

41.) Has CenturyLink adopted the CSRIC best practice industry recommendations?

42.) Has CenturyLink implemented CSRIC best practice 8-7-0532 (network diversity)?

43.) Has CenturyLink implemented CSRIC best practice 8-7-0662 (power)?

APPENDIX B

Investigation of the San Juan County CenturyLink Isolation

The following informal information requests are submitted to CenturyLink by the Washington Utilities and Transportation Staff regarding the outage in San Juan County caused by a fiber malfunction or cut on November 5, 2013.

44.) In response to Data Request (DR) No. 5, The Company did not provide any documentation relating to the consultant's work or recommendation. Did the consultant provide a written opinion justifying his recommendation?

45.) In response to DR No. 6, the Company's reply was "The only damage since the cable was placed in 1999 is the November 2013 break." In response to DR No. 1, CenturyLink portrays a map with a fiber route from Anacortes to Lopez, San Juan, Shaw, Orcas, Blakely and Decatur islands. There is a note indicating that the fiber between Blakely and Decatur islands has been severed. Please respond to the items requested in DR No. 6 for this damage. Have any other underwater fiber cables between the aforementioned islands been damaged? If the answer is yes, please also respond to the items in DR No. 6 for that damage.

46.) The Company's response to DR No. 10 states "CenturyLink could not locate a manufacturer life estimate of the submarine cable placed in 1999." Please respond to the following items:

a. Does the Company have any qualified personnel that are able to estimate the remaining life of each section of submarine cable connecting the islands? If the answer is yes, please provide the estimated remaining life for each section.

b. What is the Company's depreciation rate(s) for each section of submarine cable listed in CenturyLink's response to DR No. 1? The Company should also include the number of years the asset is being depreciated, the estimated salvage value (expressed in a percentage) and any other element e.g. cost of removal, etc. that is an element of the depreciation rate.

c. Has the Company conducted any depreciation studies to confirm its depreciation rate of submarine cable is valid?

47.) In response to DR No. 11, the Company indicates it does not ordinarily replace its submarine cable unless it is damaged or has capacity issues. This response does not address the question.

48.) In response to DR No. 12, the Company's referral to the DR No. 11 response does not address the question.

49.) In response to DR No. 13, the Company's referral to the DR No. 11 response does not address the question.

50.) The Company's response to DR No. 15 indicates the company is applying for radio frequencies to support redundancy within the islands and establish a redundant path to Bellingham. Please respond to the following additional questions:

a. The radio to support traffic within the islands will support "roughly 1 GE of traffic" which will support all voice traffic and a portion of the data traffic. Please explain the reason CenturyLink is not planning to construct radio facilities that would support all voice and all data traffic within the islands.

b. CenturyLink is also planning on providing redundancy with a radio to Bellingham. The response indicates the radio capacity on this route is capable of 200mb. Please explain the reason the Company is not considering a radio facility to support all voice and all data traffic to Bellingham.

c. Does the Company have arrangements with other service providers, e.g. OPALCO, etc., on the island to be able to carry all voice and all data traffic should the fiber fail finds it necessary to rely on the redundant radio it plans for a redundant route in this response?

51.)The Company's response to DR No. 16 indicates that CenturyLink scrutinizes historical outage information, reviews the historical information weekly along with carrying inventories of spare submarine fiber cable and splice cases for outages. The San Juan fiber cable outage occurred on November 5, 2013 and service was completely restored on November 15, 2013 or 10 days. Has the Company changed any procedures or processes that will reduce the repair time in the future if the fiber should fail? Please provide a detailed answer.

52.)The Company's response to DR No. 17 indicates there is no routine maintenance procedures required or recommended. Does the Company perform any visual or video inspections of its submarine cables to determine if there is unusual wear or damage that would indicate there is a need to repair the cable before it fails?

53.)CenturyLink's response to DR No. 21 indicates that cause of the fiber optic cable failure is unknown. At this time, does the Company know what the caused the failure?

54.)In response to DR No. 29, the response states in part "The route was designated by the Department of Natural Resources, which has designated a cable placement channel between the two islands." Does this mean the Department of Natural Resources actually directed the Company to lay the submarine fiber cable on a certain path or did the Department establish a corridor and Company personnel decided where to place the cable in that corridor?

55.)Response to DR No. 32, Please provide the detailed agreements with OPALCO and the other providers referred to in the Company's response.

APPENDIX C

February 28, 2014

Sent Via Electronic and U S Mail

Mark Reynolds
CenturyLink
1600 7th Avenue, Room 1506
Seattle, WA 98191

Re: San Juan County underwater fiber cable failure
occurrence on November 5, 2013
UTC Staff Informal Data Request Nos. 56-65 to CenturyLink

Dear Mr. Reynolds:

To facilitate the Washington Utilities and Transportation Commission Staff's review of the November 5, 2013 underwater fiber failure resulting in a toll and data outages in San Juan County, please provide responses to the attached informal data requests. Since this is a Staff investigation, a Docket number has not been assigned to the investigation at this time. Please repeat the request at the top of the page on which the response begins, and indicate on the hard copy and any electronic version provided, the date the response was prepared, the individual who prepared the response, and the telephone number of the preparer.

Please provide an original and two (2) copies of the written responses to these informal data requests. Staff requests the Company respond to the data requests within 10 business days or by March 14, 2014. If you believe you will be unable to respond to some or all of the informal data requests by that date, please identify the particular requests and provide the date on which you will be able to respond to them. Please deliver the responses to William Weinman, Assistant Director – Telecommunications, P.O. Box 47250, 1300 S. Evergreen Park Drive SW, Olympia, Washington, 98504-7250. Any questions concerning data requests should be directed to William Weinman at (360) 664-1109.

Please include the following on all electronic data requests and responses e-mail distribution lists.

William Weinman: wweinman@utc.wa.gov
Bob Williamson: BWilliam@utc.wa.gov

Rebecca Beaton: rbeaton@utc.wa.gov
Rayne Pearson: RPearson@utc.wa.gov

Also, please provide all electronic attachments in native format. For example, please provide spreadsheets in Excel. Thank you.

Sincerely,

William Weinman
Assistant Director – Telecommunications

Enclosures

APPENDIX D

From: Regulatory.NEMC@CenturyLink.com [mailto:Regulatory.NEMC@CenturyLink.com]
Sent: Tuesday, November 05, 2013 4:49 AM
To: UTC DL Telecom-Outage
Subject: PUC_WA.110513.001_I

CenturyLink™
Stronger Connected™

PUC Report

Report Number	WA.110513.001
Impacted Company	CenturyLink
Date and Time	05-NOV-2013 03:47:04
TIMEZONE	PST
For Questions Contact	Mark Reynolds 206 345 1568
Reason for Outage Notification	5831 lines impacted due to toll isolation. Possible maintenance activity.
Cause of Outage	under investigation
Location of Outage	Friday Harbor/WA
Exchange Name / Wire Center	FRHRWA
Expected Duration	05-NOV-2013 08:00:00
Actual Duration	TBD
Number of Customers/ Cable pair impacted	5831
Services Affected	TOLL SWITCH ISOLATION
Agencies Notified	
Significant Update	
Resolution	TBD

APPENDIX E

From:	Reynolds, Mark <Mark.Reynolds3@CenturyLink.com>
Sent:	Friday, November 08, 2013 12:07 PM
To:	Danner, Dave (UTC); Goltz, Jeffrey (UTC); Jones, Philip (UTC); King, Steve (UTC); Vasconi, Mark (UTC); Weinman, William (UTC); Beaton, Rebecca (UTC)
Cc:	Anderl, Lisa; Walker, Tom
Subject:	CenturyLink's San Juan Outage

All,

The CenturyLink San Juan outage represents a significant outage for our company and we take very seriously our responsibility to restore service to the affected customers. The outage was caused by a severed 48 strand fiber optic submarine cable between San Juan Island and Lopez Island on November 5th. The exact cause of the damaged cable is still being investigated, but there was a minor earthquake in the area that roughly coincides with the outage. The impacted services include 911 ANI/ALI; DSL; FAA/FCC circuits; OC-12/OC-3 circuits; message trunks and toll switch isolation.

CenturyLink initially made all required notifications for such a major outage, issued a press release and has been communicating with media outlets. CenturyLink is also hosting daily coordination conference calls at 10:00 am with key players including state and local emergency management officials, county sheriff, fire department, OPALCO and wireless carriers.

Work continues on multiple projects simultaneously. Weather and strong currents are presenting significant logistical challenges for underwater operations. Additional heavy duty equipment is required and is on the way. Crews will continue working through the weekend and beyond as necessary. Our highest priority, restoration of normal 911 service, is nearing completion.

The following information, which provides a detailed status of the projects, was compiled by the Washington Military Department based on information from CenturyLink during the last daily call update (11/7 at 10:00 am):

Short-term: 911 connectivity is up on Lopez Island and is expected to be up on Orcas Island this afternoon. The OPALCO microwave link that was intended to be used between San Juan Island and Lopez Island is producing too much noise. An alternate OPALCO microwave link via Mt. Constitution on Orcas Island is being connected to the CenturyLink phone trunk instead and should be online tomorrow. Additional equipment to increase the bandwidth of this temporary link is being flown into Seattle and ferried to San Juan today, due to inclement weather. Long distance connectivity to the mainland is still down. High speed Internet access is available on Orcas and Lopez Islands, but down on San Juan Island.

Wireless Carriers:

AT&T: Orcas Island on line; Lopez should be up by noon; San Juan should be up before morning. AT&T is working with the County on routing 911 calls.

Sprint: Sites on Roche Harbor, Friday Harbor, and Lopez are all down. Techs are waiting for the weather to clear.

Verizon: Service from Orcas is limited; San Juan has two sites off-line. Crews are waiting for a break in the weather.

Long-term: Divers continue to search for the exact location of the damage to the fiber cable. A reel of fiber cable is on its way from Seattle. The plan still is to try to splice the damaged section, possibly by the end of next week. If that is not possible, it will have to be replaced. CenturyLink and OPALCO technicians will continue to work through the weekend. CenturyLink is hosting daily conference calls at 1000 hours (incl. Sat/Sun). Per phone conversation with Brendan Cowen at 1250, San Juan County Emergency Management has no resource requests.

Finally, I have been working with Rebecca Beaton regarding the WUTC notification and involvement in this event. Notice was made to the WUTC via our standard notice process on 11/5. Both Rebecca and I agree that with such a major event, the WUTC needs to be linked into all information dissemination. I assumed that the notification of subsequent meetings of

the emergency management agencies included the WUTC. Obviously that was not a good assumption and I take full responsibility for not reaching out to WUTC to ensure it was in the loop. I apologize for the inconvenience and commit to making immediate contact when future events arise. My understanding is that Commission Staff is now linked into the daily updates on service restoral and I remain available to respond to any inquiries that the Commission or its Staff may have regarding the event. Rebecca and I will also ensure that process changes are made regarding inclusion of the WUTC in any daily briefings that take place during such an event.

Sincerely,
Mark Reynolds

Mark S. Reynolds
NW Region Vice President - Public Policy
1600 7th Ave., Rm. 1506, Seattle, WA 98191
206-346-1668 (office)
206-473-4825 (cell)

APPENDIX F

From: Brendan Cowan [mailto:brendanc@sanjuandem.net]
Sent: Tuesday, November 05, 2013 3:03 PM
To: Volke, Markus; Miller, Kathleen; Sakin, Imas; Martinez, Debbie
Cc: Bob Jarman; Dave Halloran; stateemergency.operationsofficer@mil.wa.gov
Subject: San Juan County 911/Phone Outage

Markus and all at CenturyLink:

As I assume you're aware, we're in the midst of a serious comms/911 outage in San Juan County. Initital reports were that it was an underground fiber line that was dug up and it would be repaired by 2pm, but now we're hearing rumors (not from CenturyLink) that it was actually an underwater cable and might be much longer, possibly days.

So far, the information coming from CenturyLink about this has been non-existent or minimal. Calls and emails to Debbie Martinez, our local CenturyLink contact have been unreturned. I understand that you're busy, but would really benefit from better information flow from your organization.

We've long had an effective system in place where updates were emailed by CenturyLink to outage@sanjuandem.net and this automatically updated our key Emergency Response organizations. Since the personnel transition following the retirement of Bill Henikman, this has not happened.

Please provide all updates on the situation to the email address: outage@sanjuandem.net, copied to me.

I look forward to a useful discussion once service is restored on how my organization can facilitate better communication in the future. Thank you.

APPENDIX G

From: Volke, Markus [mailto:Markus.Volke@CenturyLink.com]
Sent: Tuesday, November 5, 2013 3:13 PM
To: 'Brendan Cowan'; Miller, Kathleen; Sakin, Imas; Martinez, Debbie
Cc: 'Bob Jarman'; 'Dave Halloran'; State Emergency Operations Officer (MIL); Leneweaver, William A (MIL); Volke, Markus
Subject: RE: San Juan County 911/Phone Outage

Brendan-

I just spoke to our network operations group. We've had splicers working on the fiber cut since 1:30pm today and hope to resolve this soon. Kathy Miller is our 911 service manager, and should also be a contact for you going forward. Kathy on 206-224-1077.

I copied Andy Leneweaver in the State 911 office as well.

Thanks
Markus

APPENDIX H

From: Anderl, Lisa <Lisa.Anderl@CenturyLink.com>
Sent: Tuesday, May 06, 2014 1:57 PM
To: Pearson, Rayne (UTC)
Subject: Re: questions re San Juan Outage

Yes.

Lisa Anderl
206-841-0207

On May 6, 2014, at 1:28 PM, "Pearson, Rayne (UTC)" <rpearson@utc.wa.gov> wrote:

> Sorry one more question- all of those locations are in Friday Harbor?
>
> ---
>
> **From:** Anderl, Lisa [mailto:Lisa.Anderl@CenturyLink.com]
> **Sent:** Tuesday, May 06, 2014 1:25 PM
> **To:** Pearson, Rayne (UTC)
> **Subject:** Re: questions re San Juan Outage
>
> We don't have a record of the exact dates. We think it started on about the third day.
>
> Lisa Anderl
> 206-841-0207
>
> On May 6, 2014, at 1:22 PM, "Pearson, Rayne (UTC)" <rpearson@utc.wa.gov> wrote:
>
> > Can I get dates for the postings? Thanks.
> >
> > ---
> >
> > **From:** Anderl, Lisa [mailto:Lisa.Anderl@CenturyLink.com]
> > **Sent:** Tuesday, May 06, 2014 12:23 PM
> > **To:** Pearson, Rayne (UTC)
> > **Subject:** FW: questions re San Juan Outage
> >
> > Hi Rayne – we will supplement our response to DR 5 later today with a non-confidential 1-page doc that you could describe as a condensed, high level version of the local outage response communication procedures. In addition, when I asked your other question, this is the response I got.
> >
> > > After restoral efforts were underway, we learned that posting our press releases in public places would enhance our ability to communicate with the residents. We did post our press releases on the door of the central office located at 50 Second Street, Friday Harbor, and at Kings Market, the Post Office and Market Street Grocery.
> >
> > ---
> >
> > **From:** Pearson, Rayne (UTC) [mailto:rpearson@utc.wa.gov]
> > **Sent:** Tuesday, May 06, 2014 8:44 AM

To: Anderl, Lisa
Subject: RE: 2 questions

Thanks, Lisa. I have another question- I don't see it in any of the responses, but I figured I would ask anyway. Did the company physically post any information during the outage anywhere on the islands, like at the CenturyLink office in Friday Harbor or at the fire stations?
Thanks,
Rayne

APPENDIX I

Local Procedure

Objective:

To solidify a comprehensive external communication process for Market Development Managers to follow in the event of an outage.

- MDMs are the only authorized media spokespeople in the Field (as well as SMEs they have prepared for particular topics).
- Connect with your local network manager to introduce yourself as the communications contact for outages.
- Once an outage has occurred, if you receive any media inquiries, please make sure to keep your VP/GM, RP and Corporate Communications informed about how many and what kinds of inquiries you receive. Please also keep your Public Policy people informed to help ensure consistency in messaging.
- Please provide a summary report of media inquiries once the outage has been resolved

Key Information You Should Collect

- What happened and when?
- How many customers are impacted?
- What services are being impacted (911, local, toll, Internet, business, etc.)?
- Determine whether we can accurately estimate restoral time.

CenturyLink

APPENDIX J

Expert Report San Juan Island Lopez Island Century Link Cable Break June 20, 2014

Undersea Cable Consultants, LLC. Tel: (551)404-5440
rmunoz.ucc@gmail.com

We:	Undersea Cable Consultants, LLC
On behalf of:	State of Washington Utilities and Transportation Commission
Have been nominated to:	Assist the Washington State Utilities and Transportation Commission with the investigation of the Century Link cable break that occurred on November 5, 2013.
Scope of Work:	Assessment CenturyLink's compliance to Industry Standards for the Installation, Maintenance and Fault Restoration of the San Juan Submarine Cable. Review of the information provided by CenturyLink in regards to the San Juan Submarine Cable and the other portions of the submarine cable ring connecting Lopez, Shaw, Orcas, Blakely and Decatur islands with Anacortes. Provide a technical analysis of an incident that occurred on November 5 2013 and provide a written report the Staff of the Commission ... Recommendations

Scope of Report:

1. A professional assessment of the installation of the San Juan Submarine Cable and the maintenance practices utilized by CenturyLink.
2. A review and evaluation of CenturyLink's Desk Top Study.
3. A review and evaluation of CenturyLink's Cable Route Survey
4. A professional assessment of the installation of the San Juan Submarine Cable and the maintenance practices utilized by CenturyLink.
5. A review and evaluation of CenturyLink's Route and Cable Engineering practices.
6. A review and evaluation of CenturyLink's Installation Methods.
7. A review and evaluation of CenturyLink's Cable Protection Measures.
8. A review and evaluation of CenturyLink's Submarine Cable Maintenance Methods.
9. A review and evaluation of CenturyLink's Cable Protection Measures.
10. Recommendations for improving cable system survivability
11. Recommendations for improving cable maintenance management.

Expert Witness:	The analysis and recommendations were carried out by Robert Munoz of Undersea Cable Consultants, LLC

Contents

1. Introduction

The following is my expert report, including assessments and recommendations, related to the Century Link cable break between Lopez Island and San Juan Island. The cable break was observed to have occurred sometime between the hours of 3:00 am and 4:00 am on November 5, 2015 midway in the San Juan Channel in about 230 feet of water. The Century Link submarine cable was installed in 1999 and was laid within a designated Cable Corridor. The cause of the break is still unknown.

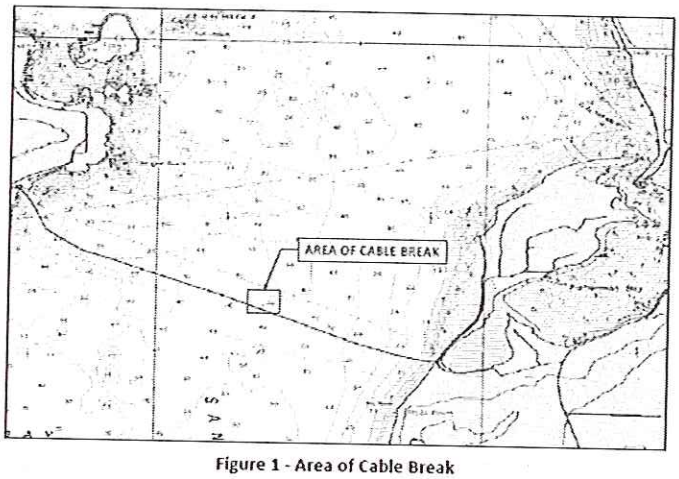

Figure 1 - Area of Cable Break

The Washington State Utilities and Transportation Commission (UTC) has opened an investigation into the Century Link cable break and the voice and data outage that affected the San Juan Islands for several days. The UTC prepared a list of data requests from Century Link including information related to system installation, cable repair operations and cable system maintenance. Based on the information provided by Century Link in response to UTC data requests, and discussions with the lead cable engineer during the repair, this report includes an assessment of the following operational events and cable protection measures associated with the cable break:

- Repair Operations
- Original Planning and Engineering
- Original installation Operations
- Maintenance Procedures Prior to the Break
- Possible causes for the cable break
- Assessment of the current state of the cable system

This report also includes recommendations for:

- Improving Cable Protection
- Improving Cable Maintenance Management
- Protecting Other Century Link Cables

The assessments and recommendations included in this report are based on over 25 years of experience with submarine cable route surveys, cable installation and cable maintenance. The recommendations are also based on industry standard practices for domestic and international telecommunications cables as established by the International Cable Protection Committee (ICPC). ICPC is comprised of cable system owners and suppliers who work together to establish guidelines and recommendations for submarine cable engineering and protection.

2. Assessment of the Repair Operations

Repair operations commenced on November 11, 2013 with a Remote Operated Vehicle (ROV) video inspection of the Century Link cable in the vicinity of the break. The ROV inspection revealed that the cable had been dragged north from its original position and pulled tight up against a rock feature.

Figure 2 - Cable Wrapped on Rock Feature

A crab pot with polypropylene line was found entangled in the cable 90 feet west of the rock feature.

Figure 3 - Crab Pot with Polypropylene Line

The parted cable end on the eastern side of the break was found approximately 65 feet west of the entangled fishing gear and the end on the western side was found to be approximately 93 feet west of that.

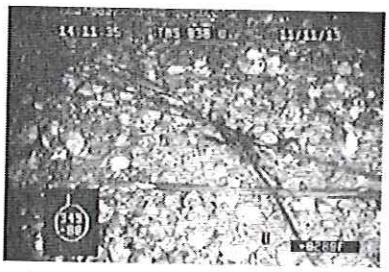

Figure 5 - Parted Cable End Eastern Side

Figure 4 - Parted Cable End Western Side

As stated earlier, the cause of the break is still unknown, however, ROV inspection of the two parted cable ends strongly suggests that the cable fault was due to a tension break (as opposed to a localized failure due to abrasion).

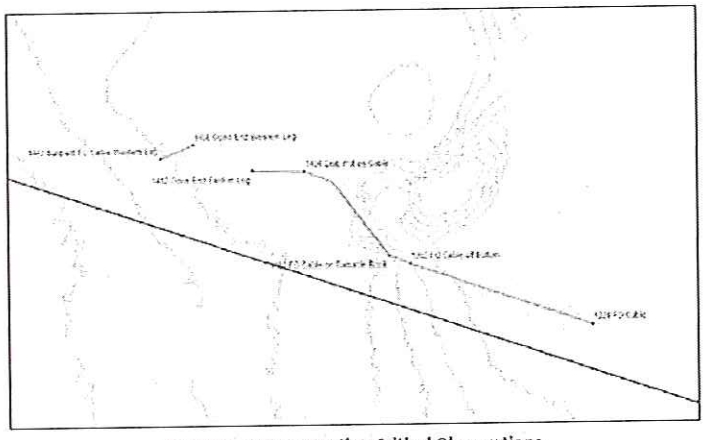

Figure 6 - ROV Inspection Critical Observations

Cable repair operations commenced with the recovery of the parted western end of cable. Once sufficient cable had been recovered beyond any damaged cable and water ingress, the western end of cable was cut and prepared for splicing. The western end of cable was spliced to a section of spare cable, and once the splice was completed, the repair barge began laying spare cable eastward towards the Fishermen Bay landing. The cable repair was completed with a new shore end landing at Fishermen Bay.

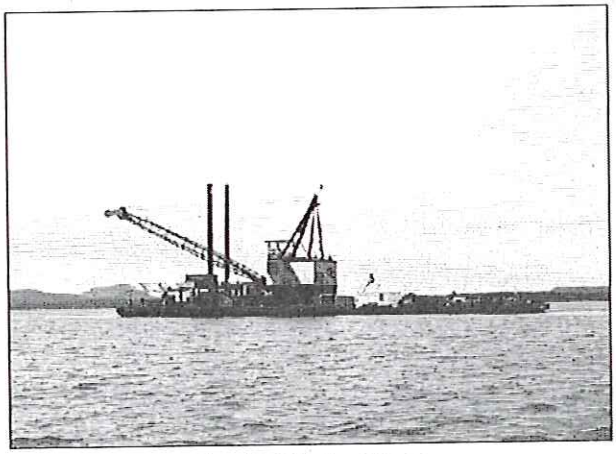

Figure 7 - Cable Repair Barge

The *As Repaired Cable Route* for the Century Link cable is shown as a red line in the figure below.

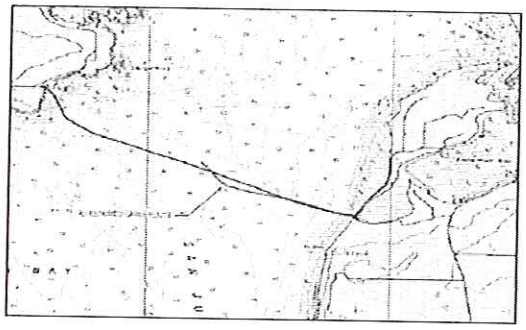

Figure 8 - As Repaired Cable Route

Upon completion of the repair's cable lay and cable landing, ten (10) foot long lengths of 1 ¾ inch chain were laid transversely over the cable at 7 locations, including one at the splice box as a means of stabilizing the cable on the seabed.

Figure 10 - Anchor Chain on Cable

Figure 9 - Anchor Chain on Splice Box

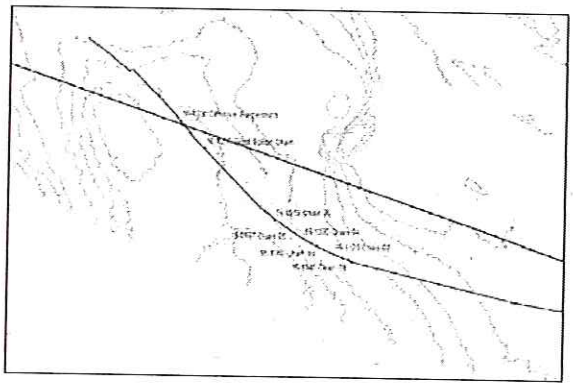

Figure 11 - Anchor Chain Locations

The ROV also conducted video inspection of the Century Link cable starting west of the cable repair splice and then to the east, towards the Fishermen Bay landing. Areas of slight suspensions were found to the west of the cable repair splice.

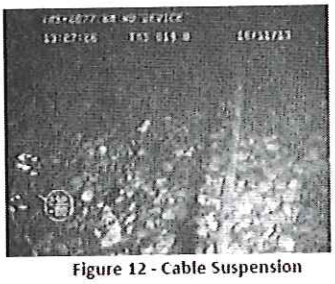

Figure 12 - Cable Suspension

The suspensions may be problematic over time depending on whether or not the cable settles into the seabed at the touchdown points. If the cable remains suspended for a long period of time, the risk of abrasion failure due to cable strumming in the current should be considered.

Two loops in the cable were found closer to shore off the Fishermen Bay landing. The cable loops will not pose a risk to the cable's survivability. The minimum bending diameter for the Perelli MF48 submarine cable is 1000 mm (3.28 ft). The ROV inspection shows the minimum bend diameter has not been violated and the cable loops are lying flat on the seabed. Sections of chain were laid across both cable loops to stabilize them.

Figure 14 - Cable Loop 1

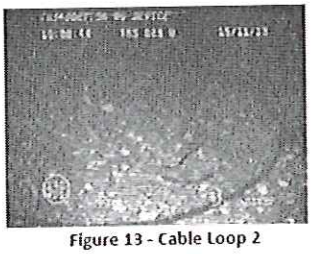

Figure 13 - Cable Loop 2

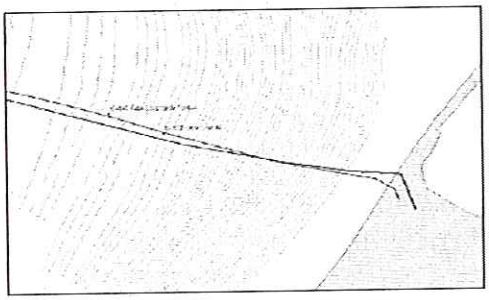

Figure 15 - Cable Loop Locations

The cable system service was restored in less than 10 days after the break which is somewhat unusual for shallow water repairs. Shallow water repairs require specialized equipment such as a barge, navigation tools, cable chute, a powered cable reel and experienced repair personnel. A ROV was also on site to assist with locating the cable break and performing the repair. For all of these tools and resources to be made available in such short notice is an achievement worth noting. It usually takes up to a month or more to mobilize the necessary tools and resources for a shallow water repair.

3. Evaluation of Century Link's Desk Top Study.

Century Link did not produce a Desk Top Study Report. A Desk Top Study is typically performed to assist with cable route planning and to identify potential risks to the cable that might affect long term survivability. Desk Top Studies usually include the following list of pre-engineering studies:

- Fishing Activity
- Seismic Activity
- Existing Cables
- Geology
- Currents
- Seabed conditions

The Desk Top Study also provides a recommended cable route, cable route survey requirements and recommendations for cable installation and cable protection.

4. Evaluation of Century Link's Cable Route Survey

No route survey data was provided by Century Link for the cable route between Lopez Island and San Juan Island. Typically, a cable route survey is performed to collect bathymetric and geophysical data to assist in the routing of the submarine cable. Route survey data is used to optimize the cable route in terms of risk and cost. Cable route selection is performed using the route survey data and to avoid natural seabed features and manmade hazards. In response to Data Requests 44-45, Century Link stated that the Department of Natural Resources established a corridor and Century Link decided where to place the cable in the corridor.

5. Evaluation of CenturyLink's Route and Cable Engineering Practices.

From the information provided by Century Link related to the original routing of the 1999 fiber optic cable, a cable corridor was established by the Department of Natural Resources. The cable route was laid within the corridor without regard for seabed features or seabed contours. Standard practice for routing submarine cables is to attempt to cross slopes perpendicularly and to maintain separation from hazardous seabed features. The cable route selection process may have been improved had a formal Desk Top Study and Cable Route Survey been performed.

Overlaying the 1999 cable route on the 2013 OPALCO survey data, the Century Link cable was installed within 80 feet of the rocky features within the cable corridor.

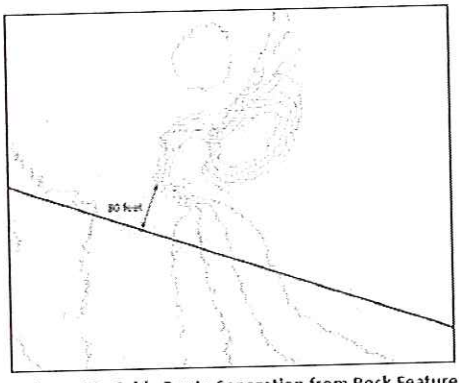

Figure 16 - Cable Route Separation from Rock Feature

It would have been more desirable to route the cable to the south thereby crossing bathymetric contours at right angles and avoiding the rocky area and a seabed depression.

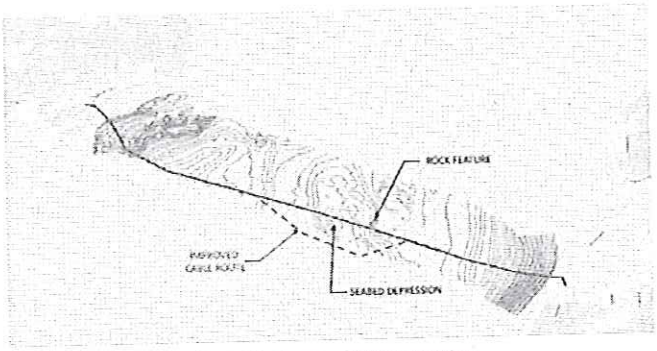

Figure 17 - Improved Cable Routing

6. Assessment of the Installation of the San Juan Submarine Cable

Submarine Cable Systems are generally engineered with a design life of twenty-five (25) years for materials and undersea components such as cable, subsea splices and repeaters. The placement of the cable and the quality of the installation will determine the survivability of the cable against external threats such as abrasion failure due to cable suspensions, or tension breaks due to underwater landslides, bottom fishing or vessel anchors.

The Century Link cable was installed in 1999 and it did not experience a cable fault until 2013. These 14 years of uninterrupted service is a testimony to the system design and the quality of the installation. Especially with respect to the strong tidal currents in the San Juan Channel which can run at speeds of up to 4 knots. Had the cable been installed with insufficient bottom slack and with cable suspensions, would most likely have failed due to an abrasion fault within one or two years after the installation.

An observation worth noting is that the 2013 OPALCO route survey identified a linear feature that lines up with the Century Link repair splice position. The broken cable was found approximately 245 feet north of the documented 1999 as laid position. The linear feature (green dashed line in the drawing below) appears to run parallel to the 1999 cable route without any deviations or signs of localized displacement. It is possible that the cable laid in 1999 was actually laid 245 feet north of the documented route position list. This would have routed the 1999 Century Link cable through the rocky areas from the very start.

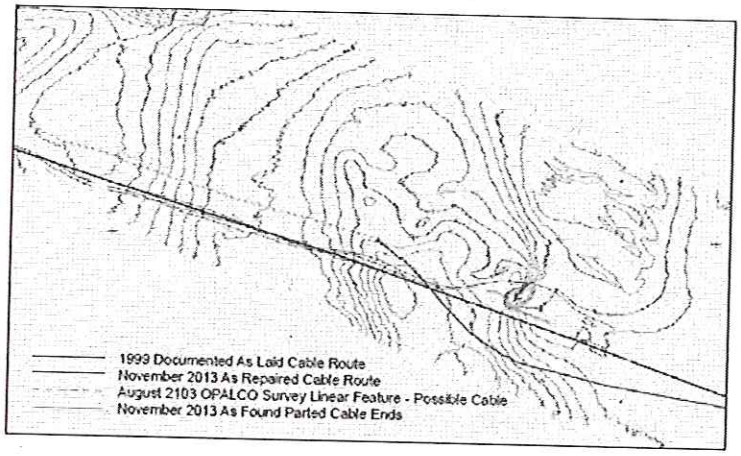

Figure 18 - Linear Feature Possible Actual As Laid Route

In hind sight, the cables in the San Juan Channel could have been buried below the seabed using either a towed plow or an ROV with jet burial capabilities. Cable burial should be considered for future cables crossing the channel.

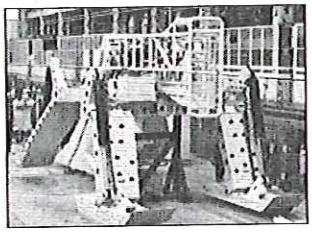

Figure 20 – Towed Sea Plow

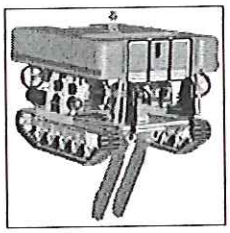

Figure 19 – ROV with Jetting Swords

The seabed viewed on the ROV inspection videos and the geophysical interpretations taken from a 2013 route survey for the OPALCO power cable suggest that cable burial is feasible in the channel.

7. Assessment of System Maintenance Procedures Prior to the Cable Break

From the information provided by Century Link in response to the UTC data requests, there did not appear to be a formal set of maintenance procedures. Century Link did state that the company had maintained restoration inventory in Washington for submarine cable repairs.

In response to Data Request 44-45, Century Link stated that the company did not proactively replace cable in anticipation of failure. They also stated that there were no routine maintenance procedures. The company did not perform any visual or video inspections of the submarine cables to determine if there was unusual wear or damage that would indicate a need to repair the cable before it fails.

The lack of preventative maintenance programs for shallow water cables is not uncommon among submarine cable owners and operators. Rather than invest time and money to conduct periodic inspections or take extra measures to improve cable protection, they only react to cable breaks and system outages.

From conversations with Cliff Center, Lead Repair Engineer with Harbor Offshore, the success of the repair was the result of locating material and resources in a very short period of time. Availability of resources is critical to performing a fast response and minimizing outages. Although there was not a pre-planned process for obtaining these resources, the repair was carried out in good time. However, this is normally not the case in shallow water repairs. Had the repair equipment or experienced personnel been assigned to another project, it could have taken a month or more to repair the cable.

A formal maintenance program includes the tracking and management of spare inventory and a list of potential resources with primary and secondary lists. Periodic inspection should be

performed to determine if the cable has been displaced or damaged over time. A Cable Awareness program should be implemented to notify vessels and any seabed users as to the location of the cables and what action to take if a cable is engaged.

8. Possible Causes of the Cable Break

The cause of the cable break is still unknown. There are several different categories for causes of submarine cable breaks:

- Abrasion faults due to cable suspensions and cable strumming
- Tension breaks due to external aggression from bottom fishing or vessel anchors
- Tension breaks due to seabed slumping
- Tension breaks due to seismic activity and undersea landslides
- Tension breaks due to turbidity currents

Visual inspection of the western parted cable end clearly indicated that the cable failed due to a tension break. Armor cable tension breaks are characterized by necking, or a thinning of the armor wires and copper sheath before failure.

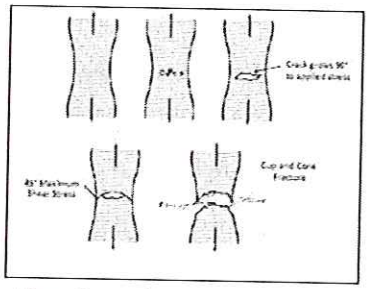

Figure 21 - Tension Break Characteristics

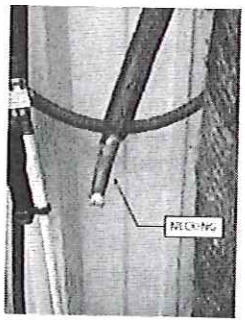

Figure 23 - Necking on Copper Sheath

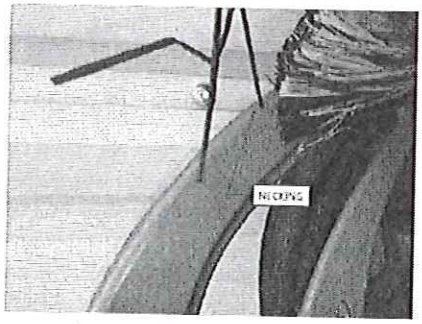

Figure 22 - Necking on Armor Wires

It is of my expert opinion that the cable was dragged along the seabed by an anchor, fishing gear or some other towed device that caused the cable to wrap itself tightly around a large rock feature. The cable broke due to excessive tension over time after multiple entanglements or during a single entanglement event.

Three possible causes of a tension break were considered in the assessment:

- Earthquake
- Fishing
- Vessel anchors and/or towed devices

8.1. Earthquake USGS Earthquake Plot Nov 5 2013

One possibility is that the cable was displaced and pulled apart as a result of an earthquake that occurred around the same time as the outage.

According to the U.S. Geological Survey (USGS) historical database, there were three earthquakes in the region on the day of the cable break on November 5, 2013.

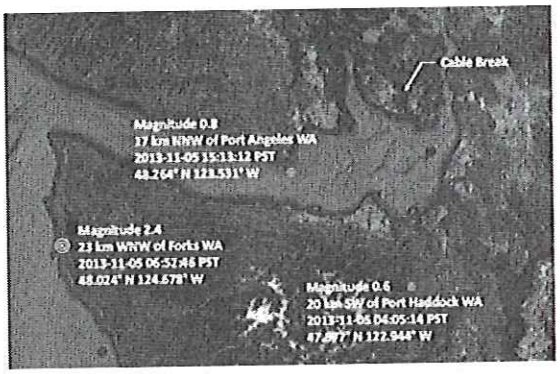

Figure 24 - USGS Historical Data November 5, 2013

Given the magnitude of the earthquakes, the 2013 OPALCO route survey and video observations of the rock features in the vicinity of the break, it seems very unlikely that any of these earthquakes were responsible for the cable break. The OPALCO survey and the ROV video inspection show no indication of instability of the rocky area. There are no signs of slumping or rock slides in the area of the break.

8.2. Fishing

Another possibility is that the cable was broken as a result of external aggression. This might include entanglement with fishing gear, a vessel's anchor or a towed device.

With regard to fishing activity, several local fishing methods are capable of damaging subsea cables. However an investigation has not indicated a clear and likely cause of this break that would be related to common and legal fishing activities. The fishing gear observed on or near the cable in the ROV video included two crab pots and various lines. Some of the lines appear to be the type (about ½" diameter synthetic fiber) that fishermen tie between pots on the seabed and marker buoys at the surface. Other lines are about 1/4" diameter, which might indicate bottom longlines for halibut. It should be noted that derelict fishing gear which fishermen have lost or abandoned is commonly found on the seabed of Puget Sound. During the past 13 years one contractor alone has recovered more than 4,600 nets and 3,000 pots from the general area. Derelict fishing gear or anchors can be snagged and dragged along the seabed causing cable damage, but there is no clear evidence that this was the case.

It seems unlikely that any common and legal fishing activity caused this break directly. For one thing, the pots, gillnets and longlines used in the area rarely damage armored cables. The timing of the break also causes doubt. It is illegal to haul the major bottom gear types in Puget Sound - crab pots, shrimp pots and shrimp beam trawls - between sunset and sunrise. The fault alarm was reported at 3:45 AM local time (11:45 AM UTC) on 5 November, 2014. It is possible that illegal fishing activity parted the cable, but one would expect the amount of illegal night fishing to be far less than daytime efforts. The following fishing methods common in the area were considered.

Crab Pots

The ROV inspection shows one crab pot entangled in the cable and another, mostly buried, in a nearby area.

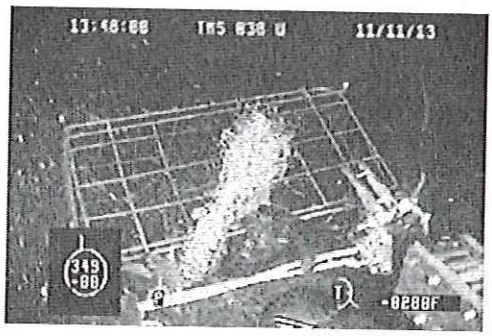

Figure 25 - Crab Pot Entangled with Cable

It is possible that a pot was involved in the cable fault, but it may also be a piece of derelict gear entangled in the cable before or after the break. Factors that make it a less likely cause include the fact that crab pots are legally required to be fished with one pot per buoy line. That means that strings of pots on "ground lines" that may be retrieved with grapnels are not used.

Crab pot fishing depths in the area are usually shallower than 100', although 200' is not unheard of. The breaking strength of a crab pot buoy line is much lower than that of an armored fiber optic cable of this diameter. Buoys are usually attached with synthetic line about ½" diameter, with a maximum breaking strength on the order of 3,700 – 7,000 lb. Even if doubled it may not reach the breaking load of an armored cable such as this. That said, it is possible for multiple strands to tangle a cable. If a tangled pot and line were dragged across the seabed by a snagged piece of towed gear, it could cause significant damage.

There are 249 commercial crab licenses in the Sound, and each one can fish 100 pots. With hundreds of vessels, and tens of thousands of pots, a great many scenarios can be envisioned.

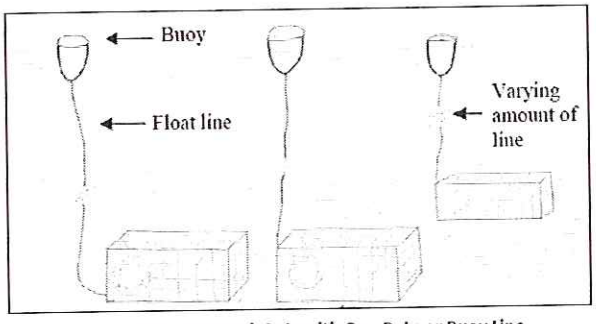

Figure 26- Crab Pots with One Pot per Buoy Line

Shrimp Pots

Shrimp pots are fished by fewer than 20 State licensed vessels in Puget Sound, as well as an undetermined number of Treaty fishermen. The pots are similar in size to crab pots but they may be fished on "ground lines", with many pots tied along a line on the seabed, and a buoy at each end of the line. This means that if the buoys are lost, fishermen are more likely to try to recover them with grapnels. In other regions this has caused cable faults. Fishing depths are typically 200' to 400', encompassing the fault range. However, the pots shown in the ROV video are clearly crab pots, not shrimp pots. Moreover, shrimp pot fishing at night is prohibited.

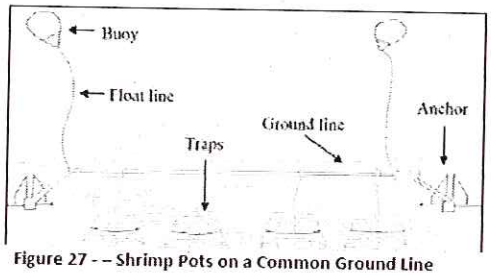

Figure 27 - – Shrimp Pots on a Common Ground Line

Shrimp Beam Trawl

The only type of bottom trawl allowed on the US side of Puget Sound is the beam trawl. Only five vessels are state licensed and active, plus at least one treaty vessel. State licensed shrimp trawl activities are subject to rigorous reporting and observer coverage, and their activities are mapped. In recent years there have been no tows reported between San Juan Island and Lopez Island. Moreover they are not equipped to tow over seabed as rough as that seen on the ROV videos, so this is an unlikely cause.

Bottom Longline

Bottom longlines are used for halibut in Puget Sound. A long ground line or main line has a series of branch lines attached, with a baited hook on the end of each branch line. Their breaking strength is generally well below that of a FO cable. However in rare cases they have caused cable faults in other regions, either by tangles, grapnel recovery, or hook point penetration of cable insulation.

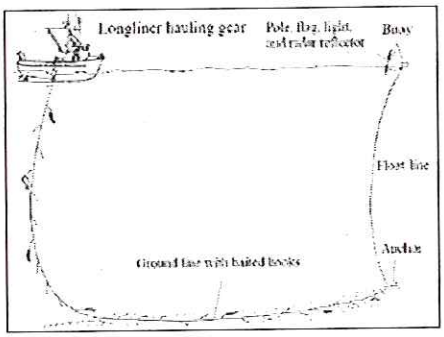

Figure 28 - Bottom Longline

In summary, the types of gear described above have caused occasional fiber optic cable faults in other regions. However, given the time of the fault, seabed characteristics, and technical characteristics of local fishing methods, there is no clear evidence that this fault was caused by fishing. It is possible that illegal night fishing or other human activity caused the break, but to date no clear evidence has emerged to support a clear cause. In any case, it would be prudent to ensure that local authorities, research vessel operators, passenger vessels, vessel traffic controllers, fishing agencies and fishermen are aware of the cable and the importance of avoiding damage.

8.3. Anchors and Towed Devices

Still yet another possibility is that the cable was broken as a result of external aggression that may have included entanglement with a vessel's anchor or some type of towed device.

In an effort to identify any vessel activity on the date of the cable break and in the vicinity of the cable break, a search of historical vessel traffic data was performed. The Automatic Identification System (AIS) is an automatic tracking system used on ships and by vessel traffic services (VTS) for identifying and locating vessels using AIS base stations located along coast lines or a growing number of satellites. Information provided by AIS equipment includes unique vessel identification, position, course, and speed.

8.3.1. AIS Sources Queried

The main AIS data resource used was SiiTech, Inc.. SiiTech Inc. provides vessel data and vessel tracking services including the vessel tracking history. The location of their antennas is uncertain but it was clear they had many ships visible continuously in the area of interest, indicating good coverage.

A small data set was purchased from Marine Traffic. Marine Traffic receives data feeds from an antenna in Friday Harbor and their data also indicated a good source of vessel tracking information.

Other services queried included vesseltracker.com, shipfinder.com and AISLive.com. They all appeared to have decent coverage of the area, but SiiTech and the Marine Traffic were the only services that provided historical data for the area of the cable break.

8.3.2. Research Vessel Centennial

AIS data initially pointed to activity of a research vessel. The RV Centennial is capable of such a complete cable break, with 58' length, 425 HP engine, winches, trawl and dredge equipment for scientific sampling. However AIS records indicated that the RV Centennial was at the dock in Friday Harbor when the fault was reported. It did not arrive in the break area until approximately 10:14 PM PST on transit to an area well south of the break. It returned to the break area and conducted more complex maneuvers at slow speed at approximately 1:30 PM PST, almost ten hours after the reported alarm.

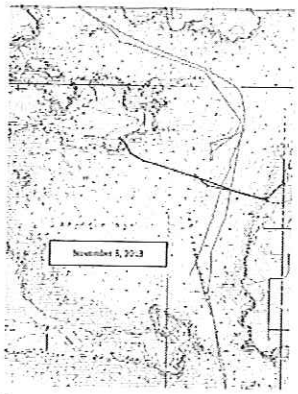

Figure 29 - RV Centennial Nov 5 2013

The RV Centennial calendar (available in the Friday Harbor Laboratory's website) indicated that the RV Centennial made similar cruises on October 9, October 15, October 22 and October 29 of 2013. Historical vessel tracks to the RV Centennial for those dates all show changes in speed and heading in the vicinity of the cable areas.

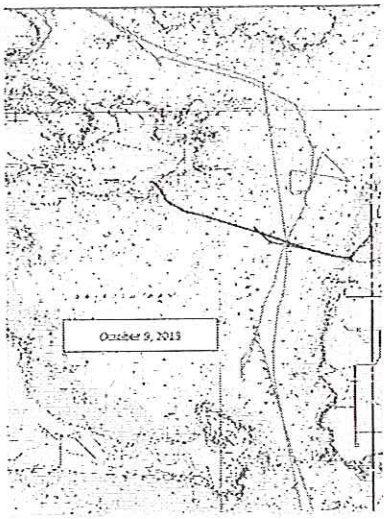

Figure 30 - RV Centennial Oct 9 2013

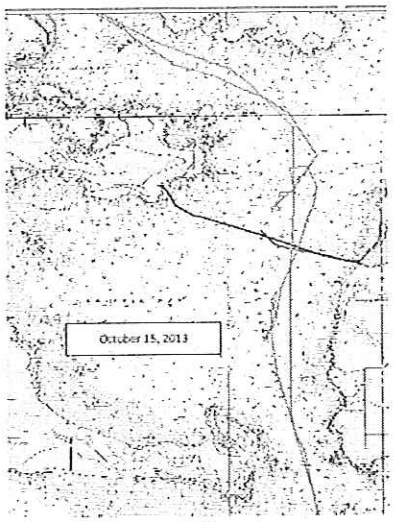

Figure 31 - RV Centennial Oct 15 2013

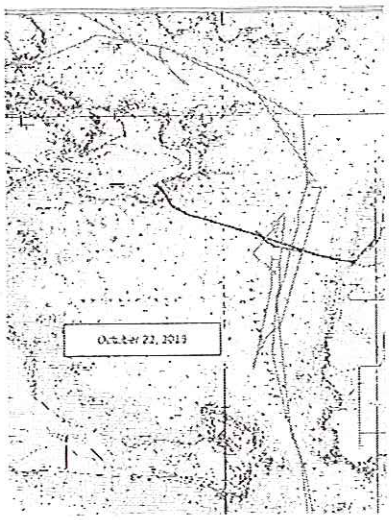

Figure 32 - RV Centennial Oct 22 2013

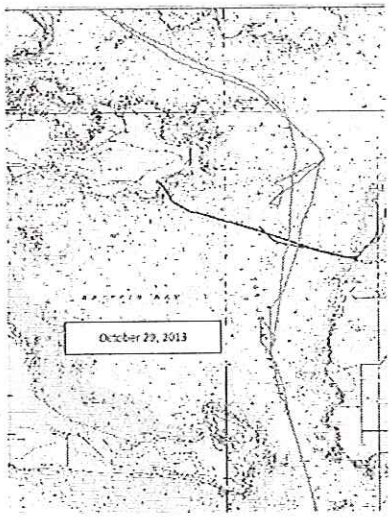

Figure 33 - RV Centennial Oct 29 2013

No other AIS records were found indicating that other vessels were in the area at the time of the break, or in the hours leading up to the break. However, fishing vessels and many other vessel types are not required to broadcast AIS. It is possible that such a vessel was involved.

9. Recommendations for Improving Cable Protection

9.1. Cable Burial

Post lay burial may be performed on sections of the Century Link cable in the middle of the channel. Geophysical data interpretations from the 2013 OPALCO survey indicate that most of the seabed along the cable is comprised of a mixture of sand and gravel.

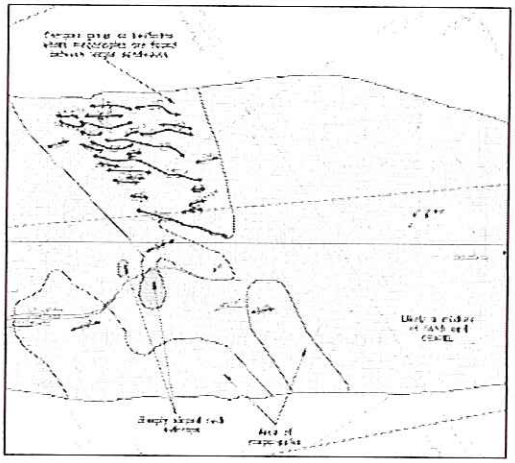

Figure 34 - 2013 OPALCO Survey Geophysical Interpretation

An ROV with high pressure jetting swords could be used to retro bury the Century Link cable to a target depth of 1 meter below the seabed.

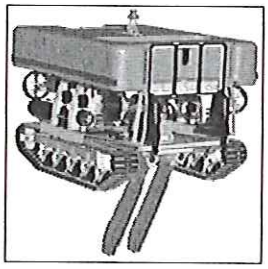

Figure 35 - ROV with Jetting Swords

9.2. Cable Awareness

Cable Awareness includes post-installation measures to mitigate the risk of cable faults caused by human activities such as fishing and vessel anchoring.

The 2013 OPALCO survey data indicates that several of cables in the vicinity of the cable break have been dragged to the north into the rocky areas. The 1995 OPALCO Power Cable repair encountered fishing nets entangled with the cable. The 2013 Century Link cable repair encountered a crab pot entangled with the cable and visual inspection of the cable showed damaged sections of jute indicating that the cable had been dragged along the seabed or that an object had been dragged along the cable.

Figure 36 - Balled Up Jute

This suggests that vessels have been active in the area and that the cables have been subjected to external aggression from bottom fishing, anchors or towed devices.

The cable areas are clearly marked on NOAA Nautical charts, however, vessel operators may not be sensitive to the cables and not informed as to what actions should be taken if they suspect entanglement.

One of the first steps in a Cable Awareness program is to identify the particular risks likely to affect the cable. Specific measures may then be developed. Such measures must also take into account the characteristics of the different vessels active in each area, such as fishermen, merchant mariners, pilots, port authorities, military officers, marine traffic control officials and research vessels. These risks may change over time.

It is recommended that updated copies of Cable Warning Charts are provided to the various vessel owners and operators in the area to ensure that they are aware of the cables' positions and of the cable protection areas and they are aware of fishing /

anchoring restricted areas. This reduces the likelihood of a cable being fouled by a local vessel.

Cable awareness fliers can be developed and distributed to all local vessel operators. These fliers should provide a chart of the cable areas and instructions to cut away any gear that is suspected of being entangled with a submarine cable.

9.3. Automatic Identification System (AIS)

The installation of an AIS receiver can be used to provide proactive protection against ships that are dragging at anchor. AIS can also be used as a reactive tool, in the event of a ship dragging its anchor while underway. At cable landing points where a cable station has a clear view of the landing and of the route of the cable, it is possible to install an AIS receiver in a suitable place with an aerial on the roof. When connected to the internet, the system will allow the interrogation of ships' details (course, speed, call sign etc.).

With additional software, the exact cable route can be plotted and guard zones can be overlaid on the route with alarms that activate at predetermined levels (such as vessel speed and heading). When an alarm condition occurs, emails or SMS text messages can be sent automatically to Cable Owners. The offending ship can then be contacted via the local Coast Guard to advise them of the proximity of cables.

10. Recommendations for Improving Cable Maintenance Management.

To ensure similarly rapid response times in the future, Century Link plans to maintain parts and equipment necessary for this type of repair in inventory. During a meeting with Cliff Center it was stated that the rapid repair was a result of "all the planets lining up at the right time." Had any one of the critical components required for the repair not been available, it would have resulted in a longer time to restore the system.

Century Link stated that the company intends to replace the inventory that was used during the San Juan outage and to have 26,000 feet of spare cable in inventory. The splice kits are fabricated to support the specific types of cable being spliced and there is vendor dependency for the splice kits and materials. CenturyLink is in the process of ordering spare splice kits and materials from the vendor to maintain a replacement inventory.

In addition to replenishing spares and maintaining an inventory of spares, the company should consider identifying several potential contractors who are capable of performing submarine cable repairs. Repair call out procedures should be developed as a means of reducing response times for repair teams and initiating restorations circuits.

Interaction with other cable owners should also be established and a notification procedure should be implemented prior to any repairs and/or new installations.

10.1. Recommendations for other Century Link Cable

Century Link owns and operates several other submarine cables in the State of Washington. A map of Century Link fiber optic network is provided below. The submarine cable sections of the network have been highlighted in red.

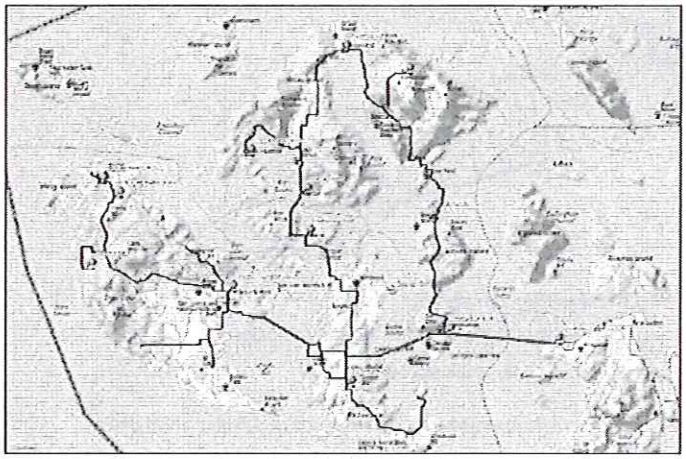

Figure 37 - Century Link Submarine Cables in the San Juan Islands

NOAA nautical charts clearly show the cable areas associated with all of the Century Link cables in the San Juan Islands. Most of the cable crossings are in relatively shallow water and the threats from anchors and bottom fishing are low. The cable from Anacortes to Decatur Island crosses the Rosario Strait, which is a major shipping channel. More than 500 oil tankers pass through the strait each year, to and from the Cherry Point Refinery and refineries near Anacortes. The strait is in constant use by vessels bound for Cherry Point, Bellingham, Anacortes, and the San Juan Islands. There is a low risk of a large vessel dropping anchor, unintentionally or in an emergency situation. Should an anchor ever cause a break in the cable, a repair operation would be extremely difficult as the repair vessel would have to work in the middle of the shipping lanes. The company should contact Port Authorities to inquire about restrictions to performing repair operations in the Rosario Strait. Any such restriction would require special repair operations, possibly abandoning the cable in the shipping lanes and installing a new section of cable.

Century Link also stated that the company owned and operated submarine cables in the Seattle area. Some of these cables also cross busy shipping lanes and the same constraints and considerations could apply.

10.2. Recommendations for Future Cable Systems

From conversations with UTC and Century Link, there are several live cables and several out of service cables laid in the same vicinity as the Century Link cable. From the ROV video inspection and the 2013 OPALCLO survey, it is clear that these cables cross each other.

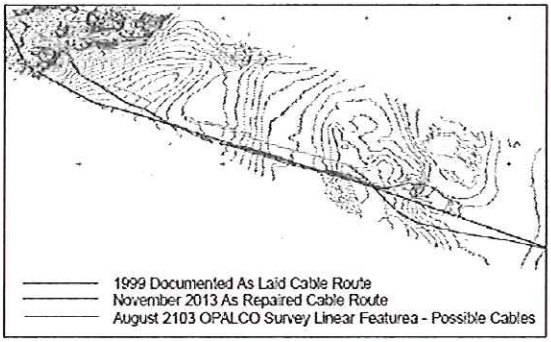

Figure 38 - Other Cables in the San Juan Channel

Great care will need to be taken on future cable repairs so as not to damage another live cable. As additional cable are planned for the future, Century Link and other cable owners should interface with each other to establish new non-conflicting cable routes. Removal of out of service cables is now required t many landing sites around the world. Consideration for cable removal at landing sites may also be required at some into to make room for new cables.

Cable separation and cable crossing angles should be considered during the planning and installation of new cable. Failure to follow industry standard practices will result in unrecoverable sections of cable.

11. Conclusions

After careful review and analysis of the information and data provided, my overall assessment is that the 1999 Century Link cable was installed properly in terms of cable slack allocation and cable type selection. The original cable routing could have been improved had a Cable Route Survey been performed prior to the installation. There is also some doubt as to whether the cable was laid further to the north than originally documented and that the cable may have been installed over the rocky areas to begin with.

The Cable Repair was a notable success as evidenced by the quick response and short amount of time to locate the fault and restore system operability. Given the weather conditions and the strong tidal currents, it could easily be expected that a repair would take much longer.

The suspensions found east of the repair splice may prove to be problematic over time. Hopefully, the cable will self-bury itself at the contact points to relieve the cable suspension. If the cable remains suspended for a long period of time, the risk of abrasion failure due to cable strumming in the current should be considered.

Future cable planning should include a Desk Top Study and Cable Route Survey.

Future cables should consider cable burial to help stabilize the cable and to protect the cable form external aggression.

Post lay burial should be considered on sections of the Century Link cable in the middle of the channel. Geophysical data interpretations from the 2013 OPALCO survey indicate that most of the seabed along the cable is comprised of a mixture of sand and gravel. An ROV with high pressure jetting swords could be used to retro bury the Century Link cable to a target depth of 1 meter below the seabed.

It is recommended that updated copies of Cable Warning Charts be provided to the various vessel owners and operators in the area to ensure that they are aware of the cables' positions and of the cable protection areas and that they are aware of fishing / anchoring restricted areas. This will reduce the likelihood of a cable being fouled by a local vessel.

Cable awareness fliers should be developed and distributed to all local vessel operators. These fliers should provide a chart of the cable areas and instructions to cut away any gear that is suspected of being entangled with a submarine cable.

In addition to replenishing spares and maintaining an inventory of spares, the company should consider identifying several potential contractors who are capable of performing submarine cable repairs. Repair call out procedures should be developed as a means of reducing response times for repair teams and initiating restorations circuits.

Interaction with other cable owners should also be established and a notification procedure should be implemented prior to any repairs and/or new installations.

The company should contact the Port Authorities to inquire about restrictions to performing repair operations in the Rosario Strait. Any such restriction would require special repair operations, possibly abandoning the cable in the shipping lanes and installing a new section of cable.

Century Link also stated that the company owned and operated submarine cables in the Seattle area. Some of these cables also cross busy shipping lanes and the same constraints could apply

Great care will need to be taken on future cable repairs so as not to damage another live cable. As additional cable are planned for the future, Century Link and other cable owners should interface with each other to establish new non-conflicting cable routes. Removal of out of service cables is now required t many landing sites around the world. Consideration for cable removal at landing sites may also be required at some into to make room for new cables.

APPENDIX - Material Reviewed

Files Provided by Century Link

Name

001) CONFIDENTIAL Response to DR 55.pdf
002) Weinman Letter 1-29-2014.docx
003) responses to DRs 44-55.docx
004) Weinman Letter 1-22-2014.docx

005) Consumer Protection DR Responses 1-7.docx
006) Responses to CP Data Request.pdf
007) CP-5 CONFIDENTIAL Local Outage Procedure 7-15-13 .pptx
008) CP-5 CONFIDENTIAL Outage Process-Corporate Communications.pptx
009) SANJUAN ISLAND FIBER.pptx
010) CP-6 CONFIDENTIAL Natural Disaster Checklist CP-6.xlsx
011) Confidential DR 36 WA UNDERWATER FIBER.pptx
012) Confidential Response to DR 1.pptx
013) Confidential Response to DR 26 SJ cable Q 26.pdf
014) Confidential Response to DR 27 S J cable Q 27.pdf
015) CP-3 San Juan CenturyLink News Release 11 13 2014 Outage.zip
016) CTL Confidential Response to DR 56.docx
017) CTL REDACTED Confidential Response to DR 56.docx
018) CTL Responses to San Juan Island fiber cut informal information requests.docx
019) CTL responses to UTC Staff DRs 56-65.docx
020) Response to DR 4.pdf
021) San Juan Island fiber cut informal request to CenturyLink Sent to Co._2-18-14.docx
022) San Juan Island fiber cut informal request to CenturyLink Sent to Co._12-6-13.docx
022) San Juan Island informal data request cover letter 12-6-13.docx
Confidential - Color version of DR 26 attachment.pdf
CP-3 Pix 01.jpg
CP-3 Pix 02.jpg
CP-3 Pix 03.jpg
CP-3 Pix 04.jpg
CP-3 Pix 05.jpg
CP-3 Pix 06.jpg
CP-3 Pix 07.jpg
CP-3 Pix 08.jpg
CP-3 Pix 10.jpg
Letter to Weinman 3-14-2014.docx
PHOTOS AND MAPS.pdf
PHOTOS AND MAPS.pptx
ROV Video 1
SJC1 1-13-14.JPG
SJC2 1-13-14.JPG
SJC3 1-13-14.JPG
SJC4 1-13-14.JPG
SJC5 1-13-14.JPG
SJC6 1-13-14.JPG
SJC7 1-13-14.JPG
SJC8 1-13-14.JPG

Files Received from Harbor Offshore

Name
11-1144 Small Black Coax Inspection.txt
11-1157 Western Extent.txt
11-1202 MesoTechScan.txt
11-1208 Snapshot.txt
11-1210 Coax Power Cable Crossing.txt
11-1224 FO Cable.txt
11-1253 FO Cable off bottom.txt
11-1303 FO Cable on Barnacle Rock.txt
11-1341 Obstruction on Cable.txt
11-1357 Obstruction on Cable.txt
11-1400 Elongated Armor.txt
11-1404 Crab Pot on Cable.txt
11-1412 Open End Eastern Leg.txt
11-1444 Black Sheathed Cable End.txt
11-1447 Suspect FO Cable Western Leg.txt
11-1458 Open End Western Leg.txt
12-1320 Open End Western Leg.txt
12-1331 Chain Placement.txt
12-1405 Chain Placement.txt
12-1430 MesoTech Scan.txt
13-0750 Bucket.txt
14-1527 Splice Location.txt
14-1548 ROV Picture Location.txt
14-1631 ROV East End of Anchor Wire.txt
14-1740 End ROV Cable Inspection.txt
15-0945 Cable Loop Inside Position.txt
15-0945 Cable Loop Position.txt
15-1002 Cable Loop #2.txt
15-1020 Old East Cable Crossing.txt
15-1025 Smooth Jacket Cable Crossing.txt
15-1037 75ft Stopping Point.txt
15-1052 Old East Cable End Inspection.txt
15-1230 Practice.txt
15-1443 Chains on Loop.txt
16-0919 Chain 06.txt
16-0957 Chain 05.txt
16-1030 Chain 04.txt
16-1050 Chain 03.txt
16-1120 Chain 02.txt
16-1140 Chain 01.txt
16-1230 West Splice Chain.txt
16-1315 East Splice Chain.txt
16-1330 Offshore Suspension.txt
16-1430 Sumo Tomo Splice.txt
Betcher Lopez Submarine Cable Landing2007.dwg
CenturyLink Cable Repair As-Built 11-30-13final.dwg
DNR1.pdf
DNR2.pdf

DNR3.pdf
OPLAL.20K-1002-130819.pdf
Position Fixes
Position Fixes.zip