



BLOCK ISLAND TRANSMISSION CABLE OUTAGES _____ (March 2024)

Background

On May 1, 2017, the Block Island Utility District d/b/a Block Island Power Company (“BIPCo”) began receiving its power supply from the mainland through the newly constructed Block Island undersea transmission cable which connected Block Island, which is situated approximately twelve (12) miles off the southern coast of Rhode Island, to the mainland electric grid. Prior to the connection, BIPCo used four (4) on-island diesel generators for 100% of its supply needs and consumed nearly 1,000,000 gallons of diesel fuel annually. BIPCo still owns and maintains generators as back-up in the event of a cable outage. The undersea transmission cable is also the only connection to the United States’ first and largest offshore wind farm, commonly referred to as Deepwater Wind.¹

Between late November 2022 and mid-January 2023, the undersea transmission cable experienced two outages causing the Division to investigate² with a view to ensuring there was not a systemic problem with the cable. The reliability of the cable is more important than ever given the passage of the Act on Climate.³ A cable outage requires BIPCo to run its backup diesel generators that produce higher carbon emissions than the power supplied from the mainland and prevents the renewable power from the offshore wind farm from being transmitted to the mainland. The Division concluded through its investigations that the two (2) outages were not related, and that there is no systemic problem with the cable.

Friday, November 18, 2022, Outage

At approximately 2:14 p.m., the Block Island 34.5kV 165T1 undersea transmission cable (“cable”) lost power. There were no reported injuries related to this event. The evidence suggests that the outage was most likely caused by a transient fault⁴ on the system (animal or object such as a tree branch causing an arc) on an exposed bare wire overhead section of the transmission system maintained by Rhode Island Energy (“RIE”), near the RIE substation located on the property of BIPCo. BIPCo was able to use its onsite backup diesel generators to restore power to all customers in New Shoreham in a matter of minutes. The cable outage, however, lasted 22 hours and 38 minutes. BIPCo was able to transition from its generators back to cable power without its customers experiencing a second outage.

The exact cause of this outage could not be determined. However, RIE did find a burn mark from a prior outage located on the exposed cable going to the offshore wind turbines, in close proximity – a few feet – from the general area of the exposed bare wires. The evidence suggests that the instant transient fault occurred in this location.

¹ Block Island Wind Farm is located approximately 3.8 mi off the coast of Block Island. The five-turbine, 30 MW project was developed by Deepwater Wind in 2015 and was operational in December 2016. On October 8, 2018, Orsted agreed to purchase Deepwater Wind, however these offshore wind turbines are still commonly referred to as Deepwater Wind.

² Both Division Investigation Reports can be found on the Division’s website at www.ripuc.ri.gov

³ On April 14, 2021, Governor Dan McKee signed into law the 2021 Act on Climate (RIGL §42-6.2).

⁴ A fault is an irregularity of current that occurs on the distribution system and results in an outage. Transient faults, which are temporary faults, are the most common type of faults and typically occur on overhead lines. Transient faults can be caused by events such as an animal or tree branch making contact with an overhead line.

This outage cost the utilities more than \$54,000. The cost to RIE to repair the outage was approximately \$45,000. BIPCo incurred a cost of approximately \$9,000 for 2,492 gallons of diesel fuel for the backup generators. Finally, Deepwater Wind was unable to deliver any power during the line outage and thus lost an unknown amount of power generation revenue.

Wednesday, January 18, 2023, Outage

On Wednesday, January 18, 2023, at 7:06 p.m., the Block Island 34.5kV 165T1 undersea transmission cable lost power.⁵ BIPCo used its onsite diesel generators to restore power to the island in a matter of minutes. There were no reported injuries due to this event. The cable outage also prevented Deepwater Wind from selling electricity back to the mainland. RIE repaired the electrical splice and brought the cable back in service on Thursday, January 19, 2023, at 9:20 p.m. (the cable was out for 26 hours and 14 minutes). BIPCo was able to transfer all customers from the backup generators to the Block Island Transmission System (“BITS”) cable without interrupting service. In the future, RIE is planning to install fault detection equipment that will help with fault locating, response times, and restoration efforts. The cost of this outage exceeded \$44,000.

The evidence suggests that the likely cause of this outage was a failed cable splice on the mainland near the intersection of Point Judith Road and Woodruff Avenue in Narragansett, Rhode Island.⁶ RIE had the resources readily available to investigate, make the necessary repairs, and re-energize the BITS. The failed cable splice will be sent out to the National Electric Energy Testing Research and Application Center to perform a dissection and analysis to determine/confirm the cause of the failure.

RIE’s “Distance to Fault Relays” located at the Dillon’s Corner Substation and the Block Island Substation were inaccurate in terms of identifying the location of this cable splice fault. RIE is planning to install directional faulted circuit indicators with smart controllers on the 160T1 and 165T1 overhead sections on Block Island, which will provide the capability for communicating fault data to RIE’s Energy Management System (“EMS”) which can then be used to help improve fault locating, response times, and restoration efforts. Additionally, RIE is investigating the installation of Schweitzer SEL-T401L relays on the BITS. These relays utilize travelling wave technology that can help to improve fault location accuracy.

Division Observations

RIE and BIPCo worked together efficiently and effectively to resolve these unrelated outages. BIPCo has changed its emergency action plan (which was focused largely on weather events) to include long-term cable outage preparations. BIPCo was able to restore all customers in a matter of minutes by utilizing the stationary on-site diesel generators. RIE is considering utilizing BIPCo’s equipment (trucks, etc.) to help future operational and restoration efforts due to ferry limitations with scheduling and space limitations (the ferry’s operation is dependent on the weather, and high winds can prevent the ferry from operating for days, which would prevent RIE from mobilizing equipment to the island). Both BIPCo and RIE identified a number of improvements to their systems with respect to both of these outages which should enhance future reliability and facilitate improved repair times. The Division made several recommendations to both companies with a view toward further enhancing service and reliability and will continue to monitor the utilities’ progress in improving the reliability of the undersea transmission line.

⁵ The Division was notified of the outage from RIE at approximately 19:45 on January 18, 2023, pursuant to the Division’s *Standards for Electric Utility Rules*.

⁶ GPS Coordinates 41.4315,-71.4815

RIE January 2024 Progress Report

On January 25, 2024, RIE provided the Division with the required progress report detailing the work it had done with respect to addressing the Division's concerns. According to RIE, on May 3, 2023, it successfully completed an infrared scan on all mainland underground cable and Block Island substation cable risers that supply power to Block Island. RIE found five thermal abnormalities and coordinated an outage with BIPCo to allow those abnormalities to be addressed. On May 12, 2023, RIE repaired the thermal concerns, along with installing fault indicators, and replacing polymer insulators with porcelain insulators. RIE scheduled another infrared inspection for the week of July 10, 2023, and verified that the thermal abnormalities had been eliminated. RIE is currently in the design phase for a project that will install new relaying at Dillon's Corner and Block Island Substations that will include enhanced fault locating technology, installation of additional fault indicators on the 160T1 line, installation of avian guarding, and replacement of additional insulators to increase the insulation rating of the 160T1 and 165T1 lines. These projects are expected to be completed by March 2024. In addition to the work described above, RIE is also in the engineering phase to install a new switching device on the 165T1 cable that will allow RIE to quickly isolate the land cable from the submarine cable. This work is expected to be completed by June 2025. RIE provided, and continues to provide, training to BIPCo personnel to do switching operations to disconnect the submarine cable in the event of an emergency, and has formulated plans for getting RIE personnel to Block Island in the event of a suspension of ferry operations as well as identifying local transportation services once on Block Island. In addition, RIE addressed each of the recommendations made by the Division in 2023 and either implemented the recommendations, provided an explanation as to why it chose a different approach than was recommended, and gave a status report for all ongoing projects affecting Block Island. The Division was satisfied with its report with respect to each of the Division's recommendations.