

CA-IR-8

Ref: T-3, Page 21 Line 17 through Page 23, Line 17.

In addition to the Pukele Substation, the Consumer Advocate notes that the Airport, Archer, Kewalo, Kamoku and Wahiawa substations all have less than three 138 kV feeds.

- a. If double contingency outages occur at any of these substations, will loss of load occur? Explain and provide copies of all documentation and/or analysis to support the response.
- b. What is the importance of these customer loads that could not be backed up during a double contingency outage?
- c. For each double contingency above, what is the estimate of load that could not be served during these outages (i.e., loads that cannot be backed up from other substations during the double contingency)? Provide copies of all documentation and/or analysis to support the response.

HECO Response:

- a. If a double contingency outage occurs at the Airport, Archer, Kewalo, Kamoku or Wahiawa Substations, there will be an interruption of electricity service to the customers served by these substations. See the response to subpart c.
- b. Several factors, including the size of the electrical demand being served, the criticality of the electrical demand, and if alternative means are readily available to serve the demand within the substation's service area in the event the transmission lines are unavailable, are considered when assessing the reliability of a transmission substation with less than three 138kV feeds to the substation. In general, the reliability of the Airport, Archer, Kamoku, Kewalo and Wahiawa Substations is important, although less of a concern than the reliability of the Pukele Substation, for the reasons such as the size of the load being served by the substation, the age of the facilities installed, the type of facilities installed (underground vs. overhead). Refer to HECO T-4 (pages 42-44 and pages 46-48.)
- c. The entire Honolulu Airport load cannot be served by other substations during a double

contingency outage. However, the Airport has a 2.2 MW emergency generator which can be placed on-line to serve critical loads at the Airport, such as critical lighting systems and power required to ensure the safety and security systems are active at the airport. The Airport load at the time of the 2002 Day Peak was 7 MW.

For the Archer Substation, approximately 73% of the load (~63.5 MW based on the 2002 Day Peak with the adjustments outlined in response to CA-IR-11) would experience an outage if the Iwilei-Archer and School-Archer 138kV transmission lines, which are the two lines that serve the Archer Substation, are unavailable. This includes the loads served from the Kewalo and Kamoku Substations.

All of the loads served by the Kewalo Substation and the Kamoku Substation would be lost if the two Archer-Kewalo 138kV transmission lines serving the Kewalo Substation were unavailable. At the time of the 2002 Day Peak, the Kamoku and Kewalo Substations did not have any load. The combined load for the Kamoku and Kewalo Substations at the time of the 2003 Day Peak was 5 MW. This combined load is typically spread evenly amongst the Kewalo and Kamoku Substations. (Note: Ala Moana Shopping Center has a load of 1,870 kW and a 400 kW emergency generator for critical infrastructure such as common area lighting and elevators. Neiman Marcus has a load of 1,200 kW and a 200 kW emergency generator for egress lighting. Victoria Ward does not have emergency generators, but has a battery back-up. Hawaiki Tower has a load of about 586 kVA and has a 900 kW emergency generator. The Convention Center has a load of about 3MW and has a 1.5 MW emergency generator.)

The Kamoku Substation, which transforms the power from 138kV down to 25kV, has only one 138kV feed from the Kewalo Substation. If the single 138kV feed from

Kewalo were unavailable, there would be no loss of service to the Kamoku Substation because the customers served on the 25kV system from the Kamoku Substation have a back-up 25kV feed from the Kewalo Substation.

Approximately 20% (~22 MW) of the load served by the Wahiawa Substation would experience an outage if the Kahe-Wahiawa and the Wahiawa-Waiiau 138kV transmission lines, which are the two lines that feed the Wahiawa Substation, are unavailable.