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Ref: "There are many lessons to be learned from every outage." (T-3, page 9, lines 11-12). November 9-10, 1965 -- Northeast Blackout; July 13-14, 1977 -- New York City Blackout; December 14, 1994 -- Western States Cascading Outage; August 10, 1996 -- Western State Outage; August 14, 2003 -- Northeast/Midwest US Blackout. (T-3, pages 9-11)

Question(s):

a. Are these five mainland outages more relevant to Oahu than the three island-wide blackouts (1983, 1988, 1991) and the three regional (Pukele Service Station) blackouts (1987, 1988, 2004)?

b. How familiar are you with these 6 Oahu disturbances?

c. Which Hawaii and mainland reports on outages are you read and are familiar with?

HECO Response:

a. To plan, operate, and maintain the Oahu system, the lessons learned from any outage, regardless of location, may be relevant. In particular, because multiple contingency outages on high voltage power systems do not occur often, engineers are always very interested in studying why these outages occurred. In this way, the approaches to planning, operating and maintaining the electrical system can be adjusted to avoid problems that have occurred on other systems. This process serves to help minimize outages on the local utility system. As explained in Mr. Pollock's testimony (HECO T-3) beginning on page 7, electrical system planning criteria have evolved largely in response to the lessons learned from various outages in many geographical regions. Generally, the outcome of the study of outages and "lessons learned" has been to critically review planning and operational criteria and practice for areas of improvement so that a stable and reliable power system can be planned and operated. Certainly, the level of interest and degree of scrutiny of a local outage (such as the Oahu outages cited) is very high for the effected utility, and may point out characteristics of

a particular system that are different than elsewhere. The information gained from the study of the Oahu outages, combined with the lessons learned from outages elsewhere, all contribute to the knowledge base, the approach to planning the system, and when appropriate, to changes in planning criteria.

b. See the response to subpart c. below.

c. Mr. Pollock's familiarity with the Oahu & Mainland outages cited is based on the reports that he has read, as follows:

Oahu Outages:

- 1983 Oahu Outage – Stone & Webster Management Consultants, Inc., Hawaiian Electric Company, Investigation of July 13, 1983 Blackout, February 1984.
- 1988 Oahu & 1987 Pukele Outages – Revised Final Environmental Impact Statement, Hawaiian Electric Company, Inc.'s, Kamoku – Pukele 138kV Transmission Line Project, September 2000.
- 1991 Oahu Outage – Power Technologies, Inc., PTI Report #R6-93, Investigation of 1991 Oahu Island-Wide Outage for Hawaiian Electric Company, August 26, 1993
- 2004 Pukele Outage – HECO Report, March 3, 2004, Pukele substation Outage, May 11, 2004.

Mainland Outage Reports (as referenced in Mr. Pollock's testimony (HECO T-3))

- Consortium of Electric Reliability Technology Solutions Grid of the Future, White Paper on Review of Recent Reliability Issues and System Events, Prepared for the Transmission Reliability Program, Office of Power Technologies, Assistant Secretary for Energy Efficiency and Renewable Energy, USDOE, Prepared by John F Hauler, Jeff E. Dagle, Pacific Northwest National Laboratory, August 30, 1999.

- Interim Report: Causes of the August 14th Blackout in the United States and Canada. US-Canada Power system Outage Task Force, November 2003.
- Northeast Blackout Likely to Reduce US Earnings by $6.4 Billion, Anderson Economic Group, P. Anderson & I. Geckil, AEG Working Paper 2003-2, August 19, 2003.