

LOL-HECO-IR-25

Ref: "Securing the reliability of the existing transmission lines requires regular maintenance."
(Exhibit 5, page 43)

Question(s):

- a. Under normal routing maintenance procedure, are all 138kV transmission lines treated equally in terms of the frequency of monitoring for maintenance purposes?
- b. If not, please elaborate on all the reasons certain lines and/or certain components of certain lines are checked more frequently.
- c. Could sophisticated electronic and communication devices be used, regardless of cost, which could alert central command of potential problems on a real-time basis?
- d. What is the average or normal life expectancy of a 46kV and a 138kV transmission line?
- e. What is HECO's maintenance budget for each of the transmission and subtransmission systems for the past 5 years?
- f. What is the reliability of each subtransmission line in the Pukele Service Area over the past 10 years?

HECO Response:

- a. The 138-kV overhead transmission lines are generally treated equally in terms of the frequency of monitoring. HECO conducts quarterly visual inspections of each overhead transmission circuit by air or by ground (depending on accessibility). On underground 138 kV circuits using XLPE cables, HECO does not currently perform annual inspections. For the underground 138kV circuits using HPFF cables, HECO regularly maintains the pumping plants which circulate dielectric fluids into the cables. Also, there are pressure gauges which will alarm when the pressure in the piping drops below certain thresholds indicating a problem.
- b. Not applicable.
- c. HECO already includes protective relaying, which will alert the system operator of line

overload problems on some of HECO's 138kV transmission lines as described in HECO T-4, pages 22-23. Refer also to LOL-IR-3. The further evaluation of various types of technology to monitor potential line failures in addition to remedial action schemes would be required. For example, a sagometer (which measures the conductor sag at heavy loading) could be incorporated to eliminate physical contacts to nearby objects or the use of Power Line Carrier (PLC) technology, which is currently not available on HECO's 138-kV transmission lines could be evaluated. In a hypothetical situation where communication technology such as PLC could be implemented on the HECO 138kV transmission lines, wireless sensors could be installed with transceivers on towers to send alerts to the system operator. Another option for PLC would be to install special cameras on towers to monitor vegetation growth concerns and an alert or image could be sent to the system operator if the vegetation is near HECO's 138kV transmission lines.

d. The Commission approved average service lives is as follows:

46kV and 138kV overhead poles	48 years
46kV and 138kV overhead conductors	35 years
46kV and 138kV underground conduits	60 years
46kV and 138kV underground conductors	50 years

(See Decision and Order No. 21331, filed September 3, 2004, in Docket No. 02-0391.)

e. Actual maintenance costs for the overhead and underground transmission system are shown in the table below. Actual maintenance costs for the overhead and underground sub-transmission system are included with the distribution system as filed in the FERC Form No. 1 Annual Report of Major Electric Utilities, Licensees and Others and shown in the

table below.

Maintenance Costs				
	Transmission		Distribution	
Year	Overhead	Underground	Overhead	Underground
2003	\$ 1,167,817	\$ 448,144	\$ 5,185,953	\$ 2,528,996
2002	\$ 1,269,406	\$ 309,592	\$ 6,457,070	\$ 3,780,749
2001	\$ 1,085,194	\$ 173,030	\$ 6,506,671	\$ 3,788,121
2000	\$ 1,867,066	\$ 59,914	\$ 7,646,665	\$ 3,754,860
1999	\$ 1,496,844	\$ 146,632	\$ 5,313,106	\$ 3,253,339

f. Please see the response to LOL-HECO-IR-74.