

CA-IR-26

Ref: T-9, Pages 9 and 10 (Operations and Maintenance Costs).

Regarding O&M costs used to develop cost estimates for each alternative, please respond to the following questions:

- a. Does HECO maintain records of O&M costs for underground 138 kV cable systems versus overhead 138 kV transmission lines? If so, please provide the figure for O&M of underground 138 kV transmission lines.
- b. Does HECO maintain records of O&M costs for underground 46 kV cable systems versus overhead 46 kV sub transmission lines? If so, please provide the figure for O&M of underground 46 kV transmission lines.

HECO Response:

HECO has approximately 212 miles and 6 miles of 138 kV overhead and underground lines, respectively, and approximately 1,489 miles and 1,238 miles of 46 kV, 25 kV, and 12 kV overhead and underground lines, respectively.

- a. Yes. In 2002 and 2003, the O&M costs for the 138kV underground transmission lines was approximately \$52,002/mile and \$76,013/mile, respectively. See attached pages 2-3 for the workpapers.
- b. No. The O&M costs for the 46 kV underground lines are combined with the O&M costs for the 25 kV and 12 kV underground lines. In 2002 and 2003, the O&M costs for 46 kV, 25 kV and 12 kV underground lines was approximately \$7,201/mile and \$5,717/mile, respectively. See attached pages 4-5 for the workpapers.

Transmission Expenses - 2002			
Operation		Underground	Overhead
Operating Supervision & Engineering	\$ 119,477	\$ 122	\$ 119,355
Load Dispatching	\$ 1,667,554	\$ 1,698	\$ 1,665,856
Station Expenses	\$ 430,209	\$ 438	\$ 429,771
Overhead Lines Expenses	\$ 347,228		\$ 347,228
Underground Line Expenses	\$ 354	\$ 354	
Transmission of Electricity by Others			
Miscellaneous Transmission Expenses	\$ 220,235	\$ 224	\$ 220,011
Rents	\$ 23,746	\$ 24	\$ 23,722
Total Operation	\$ 2,808,803	\$ 2,861	\$ 2,805,942
Maintenance			
Maintenance Supervision and Engineering			
Maintenance of Structures	\$ 44,135	\$ 8,653	\$ 35,482
Maintenance of Station Equipment	\$ 2,310,719	\$ 453,059	\$ 1,857,660
Maintenance of Overhead Lines	\$ 1,227,577		\$ 1,227,577
Maintenance of Underground Lines	\$ 299,390	\$ 299,390	
Maintenance of Miscellaneous Transmission Plant	\$ 7,896	\$ 1,548	\$ 6,348
Total Maintenance	\$ 3,889,717	\$ 762,651	\$ 3,127,066
Operations & Maintenance	\$ 6,698,520	\$ 765,511	\$ 5,933,009
Less Station Costs	\$ 2,740,928	\$ 453,497	\$ 2,287,431
	\$ 3,957,592	\$ 312,014	\$ 3,645,578
Overhead Line Expense in \$/mile (212 miles)	\$ 17,196		
Underground Line Expense in \$/mile (6 miles)	\$ 52,002		

Transmission Expenses - 2003			
Operation		Underground	Overhead
Operating Supervision & Engineering	\$ 164,031	\$ 458	\$ 163,573
Load Dispatching	\$ 1,554,545	\$ 4,341	\$ 1,550,204
Station Expenses	\$ 433,853	\$ 1,212	\$ 432,641
Overhead Lines Expenses	\$ 464,225		\$ 464,225
Underground Line Expenses	\$ 1,300	\$ 1,300	
Transmission of Electricity by Others			
Miscellaneous Transmission Expenses	\$ 631,174	\$ 1,763	\$ 629,411
Rents	\$ 25,580	\$ 71	\$ 25,509
Total Operation	\$ 3,274,708	\$ 9,145	\$ 3,265,563
Maintenance			
Maintenance Supervision and Engineering			
Maintenance of Structures	\$ 21,030	\$ 5,832	\$ 15,198
Maintenance of Station Equipment	\$ 2,097,895	\$ 581,795	\$ 1,516,100
Maintenance of Overhead Lines	\$ 1,123,494		\$ 1,123,494
Maintenance of Underground Lines	\$ 431,135	\$ 431,135	
Maintenance of Miscellaneous Transmission Plant	\$ 40,302	\$ 11,177	\$ 29,125
Total Maintenance	\$ 3,713,856	\$ 1,029,939	\$ 2,683,917
Operations & Maintenance	\$ 6,988,564	\$ 1,039,084	\$ 5,949,480
Less Station Costs	\$ 2,531,748	\$ 583,007	\$ 1,948,741
	\$ 4,456,816	\$ 456,077	\$ 4,000,739
Overhead Line Expense in \$/mile (212 miles)	\$ 18,871		
Underground Line Expense in \$/mile (6 miles)	\$ 76,013		

Distribution Expenses - 2002			
Operation		Underground	Overhead
Operating Supervision & Engineering	\$ 160,666	\$ 97,194	\$ 63,472
Load Dispatching	\$ 1,097,789	\$ 664,099	\$ 433,690
Station Expenses	\$ 412,816	\$ 249,730	\$ 163,086
Overhead Lines Expenses	\$ 426,870		\$ 426,870
Underground Line Expenses	\$ 653,655	\$ 653,655	
Street Lighting & Signal Expenses			
Meter Expenses	\$ 933,163	\$ 564,510	\$ 368,653
Customer Installation Expenses	\$ 167,343	\$ 101,233	\$ 66,110
Miscellaneous Transmission Expenses	\$ 3,806,037	\$ 2,302,432	\$ 1,503,605
Rents	\$ 10,660	\$ 6,449	\$ 4,211
Total Operation	\$ 7,668,999	\$ 4,639,300	\$ 3,029,699
Maintenance			
Maintenance Supervision & Engineering			
Maintenance of Structures	\$ 21,048	\$ 9,303	\$ 11,745
Maintenance of Station Equipment	\$ 1,719,136	\$ 759,815	\$ 959,321
Maintenance of Overhead Lines	\$ 4,024,378		\$ 4,024,378
Maintenance of Underground Lines	\$ 3,187,447	\$ 3,187,447	
Maintenance of Line Transformers	\$ 1,188,228	\$ 525,167	\$ 663,061
Maintenance of Street Lighting & Signal Systems	\$ 27,366	\$ 12,095	\$ 15,271
Maintenance of Meters	\$ 5,993	\$ 2,649	\$ 3,344
Maintenance of Miscellaneous Distribution Plant	\$ 1,783,359	\$ 788,200	\$ 995,159
Total Maintenance	\$ 11,956,955	\$ 5,284,676	\$ 6,672,279
Operations & Maintenance	\$ 19,625,954	\$ 9,923,976	\$ 9,701,978
Less Station Costs	\$ 2,131,952	\$ 1,009,545	\$ 1,122,407
	\$ 17,494,002	\$ 8,914,431	\$ 8,579,571
Overhead Line Expense in \$/mile (1489 miles)	\$ 5,762		
Underground Line Expense in \$/mile (1238 miles)	\$ 7,201		

Distribution Expenses - 2003			
Operation		Underground	Overhead
Operating Supervision & Engineering	\$ 314,228	\$ 188,244	\$ 125,984
Load Dispatching	\$ 1,050,318	\$ 629,214	\$ 421,104
Station Expenses	\$ 495,116	\$ 296,609	\$ 198,507
Overhead Lines Expenses	\$ 470,756		\$ 470,756
Underground Line Expenses	\$ 703,403	\$ 703,403	
Street Lighting & Signal Expenses			
Meter Expenses	\$ 875,384	\$ 524,416	\$ 350,968
Customer Installation Expenses	\$ 171,701	\$ 102,861	\$ 68,840
Miscellaneous Transmission Expenses	\$ 3,712,254	\$ 2,223,899	\$ 1,488,355
Rents	\$ 9,263	\$ 5,549	\$ 3,714
Total Operation	\$ 7,802,423	\$ 4,674,195	\$ 3,128,228
Maintenance			
Maintenance Supervision & Engineering			
Maintenance of Structures	\$ 3,480	\$ 1,218	\$ 2,262
Maintenance of Station Equipment	\$ 1,701,777	\$ 595,526	\$ 1,106,251
Maintenance of Overhead Lines	\$ 3,486,228		\$ 3,486,228
Maintenance of Underground Lines	\$ 1,876,736	\$ 1,876,736	
Maintenance of Line Transformers	\$ 782,852	\$ 273,954	\$ 508,898
Maintenance of Street Lighting & Signal Systems	\$ 23,211	\$ 8,123	\$ 15,088
Maintenance of Meters	\$ 6,899	\$ 2,414	\$ 4,485
Maintenance of Miscellaneous Distribution Plant	\$ 1,535,543	\$ 537,354	\$ 998,189
Total Maintenance	\$ 9,416,726	\$ 3,295,325	\$ 6,121,401
Operations & Maintenance	\$ 17,219,149	\$ 7,969,520	\$ 9,249,629
Less Station Costs	\$ 2,196,893	\$ 892,135	\$ 1,304,758
	\$ 15,022,256	\$ 7,077,384	\$ 7,944,872
Overhead Line Expense in \$/mile (1489 miles)	\$ 5,336		
Underground Line Expense in \$/mile (1238 miles)	\$ 5,717		