COST ESTIMATE FOR TV REASSIGNMENTS TO BROADCASTERS AND CABLE OPERATORS

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PROBLEM

Estimate the costs of changing the channel assignment of UHF TV stations in channels 70-83.

FINDINGS

The three existing UHF stations in channels 70-83 were examined. In addition, existing translators in the upper UHF band were considered. A move of 10 channels downward was assumed.

The following table summarizes the findings:

STATIONS	CURRENT ASSIGNMENT	CHANGE TO	CURRENT COST ($000)	FUTURE[1] COST ($000)
CITY	79	69	307.5	386
CBEFT	78	68	218	274
CBLFT-1	76	66	228	284

Mean (all examples considered): Present cost: $251,000
Future cost: $315,000

COST CONSIDERATIONS

1. Assumptions:

In general, the following assumptions were made:

Antenna - In all channel changes, it was assumed that a new antenna would be required. Prices for antennas were taken from the latest RCA catalogue. Where the existing antenna was RCA the substitution was simple; where the existing antenna was another brand an RCA equivalent was used.

Transmitter changes - To ensure that consideration was given to the readily identifiable components in a transmitter modification, specific figures were included for replacement of klystron, filterplexer, and harmonic filter. It may not be necessary to replace these components in all cases (i.e. retuning might be possible), but to be conservative a cost sufficient to cover replacement was used.

[1] The future cost is based on 1977 costs inflated at 6% per annum to 1983, and reduced where applicable by an amortization factor. Calculation details are shown in Annex A.

Transmission Line - for none of the cases studies was it felt that the existing transmission line would have to be replaced.

Monitoring Equipment Modification - The RCA price list gives the cost of this equipment as being $6,000 - $8,000. On the assumption that modifications would not be more than half the purchase cost of equipment, a figure of $3,000 was used.

Spare Parts and Standby Equipment - To cover purchase and modification of spare parts, etc., 50% of the total of Transmitter changes and Monitoring Equipment Modifications was added.

Miscellaneous Costs - These costs were included primarily to reflect the cost of keeping the station on the air while the changes are taking place. They are based on two sources:

a) the costs incurred by CBC in changing CBLT in Toronto from channel 6 to channel 5. These costs were in the neighbourhood of $40,000 in 1970.

b) a common sense kind of approach which looks at the cost of purchasing a temporary antenna
to this, other costs were added, such as purchase of a temporary tower, temporary transmission line, engineering costs, and strengthening of the old tower (based on CBC costs). Total cost using this approach also come to approximately $40,000.

Lost Revenue - Even if a station remains on the air during the channel change, it may claim that some revenue will be lost because it is forced to operate with temporary equipment, thereby reducing the coverage area. No estimates are available for this cost.

CATV Costs - The CATV industry may incur some costs if one of the signals they are distributing changes channels. Cost incurred would be for

- a new receiving antenna
- new headend conversion equipment
- testing
- printing of new channel guides

The cost to the CATV company for these changes is estimated to be $2,000 - $5,000 per channel.

These costs have not been included in the overall cost calculations.

2. Individual Differences:

The costs of changing channels vary considerably from one case to another. These variations are due to such factors as:

Antenna location - The case of a single broadcaster occupying his own tower presents little problem. The tower may have to be strengthened to support a larger antenna, but the costs should be manageable. Installations such as the CN Tower in Toronto present a completely different set of problems, however. Since the tower was designed to house antennas based on the existing channel allocation plan, any departure from this plan might mean a redesign of the tower, plus the added expense of doing additional work on the world's tallest free-standing structure.

Custom installations - Some broadcasters share antennas, and, thus, require custom-made equipment. A change to one of these could impose penalties on both.

3. UHF Translators:

At the present time there are 4 UHF translators in operation in channels 70-83. A change in channel assignment for these translators would involve replacing the front end, and probable replacement of the transmitting antenna.

Front end - The transmitting antennas associated with these translators are of two types:

Yagi array - used with low power translators (up to 100 W.)
- cost might be up to $2,000 plus installation

Slot antenna - used with medium power translators
- cost might be up to $5,000 plus installation

Total Cost: Maximum material cost is $10,000 per translator. If we add an additional 50% for installation and other expenses, maximum total cost per translator changed is $15,000, or $60,000 for all four.

4. Income Tax Considerations

In the case of CBC stations there are no income tax considerations, since section 149 (1) (d) of the Income Tax Act exempts from paying taxes a corporation of which at least 90% of the shares are owned by Her Majesty in right of Canada.

Privately-owned stations are, however, subject to income tax, and as such can reduce the amount of income tax payable by subtracting business expenses and capital cost allowance from income. Simplistically, if the corporate tax rate is 50%, the actual expense incurred by a company is reduced by one-half because of the decreased liability for income tax (assuming that the company has sufficient income to benefit from the reduced tax).

In actual fact, the corporate tax varies from province to province, and the time value of money makes it unrealistic to state categorically that actual expenses are reduced by the amount of the tax rate. We can, however, say that since the costs presented in this study have not been reduced by some factor for income tax saving, the figures shown are conservative (on the high side).

INFORMATION SOURCES

Bibliography

AT&T, Engineering Dept., Engineering Economy, 2nd ed., 1963

Head, Sydney W., Broadcasting in America, 2nd ed.,
Houghton Mifflin Company, Boston, 1972

Industrial Communications, Washington, D.C., April 29, 1977

Kwong, W.C., "Budgetary Estimates for UHF Stations",
CBC Engineering H.Q., (unpublished)

RCA, "Broadcast Systems Price Book", various dates

ANNEX A has been deleted from the publicly-released version of this paper because it contains information considered to be commercial confidential.

ESTIMATED COSTS OF CHANGING

CHANNELS FOR CERTAIN UHF TV STATIONS

1. CITY-TV - Channel 79 - Toronto

Existing Equipment

Transmitter:	CCA TA-15-BT; 15 kw	
Antenna:	E.M.I., power gain 28	
Transmission line:	Kabelmetal 4 1/8", efficiency 66.7%	
Change Channel 79 to 69		
Replace Antenna	$145,000[1]	
Capital Sub-total		$145,000
Transmitter Changes		
Klystron replacement	$ 46,000[2]	
Filterplexer replacement	25,000	
Harmonic filter	1,000	
Monitoring equipment mod	$ 3,000	
Spare parts & standby equip.	37,500	
Misc.	$ 50,000	
Expense sub-total	$162,5000	$162,500
TOTAL		$307,500[3]

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1 Estimated $115,000 for antenna. Normal estimate for installation would be $15,000, but because this is located on the CN Tower we have doubled this to $30,000.

2 Estimated $23,000 per klystron (2 klystrons).

3 There is an implicit assumption here that no major modifications would have to be made to the CN Tower to accommodate the new channel. If major modifications had to be made to the tower, the cost would be much higher.

If the new channel could not be accommodated on the CN Tower, an alternative antenna location would have to be found. This would add to the cost because in all likelihood a tower would have to erected (assume $200 - $450 / ft).

2. CBEFT - Channel 78 - Windsor

Existing Equipment

Transmitter:	Marconi B7320, 10 kw	
Antenna:	Bogner B16U0, power gain 18.8	
Transmission Line:	600' of 5" Heliax, efficiency 71%	
Change channel 78 to 68		
Replace Antenna	$ 90,000[1]	
Capital Sub-total		$ 90,000
Transmitter Changes		
Klystron replacement	$ 23,000	
Filterplexer replacement	25,000	
Harmonic filter	1,000	
Monitoring equipment mod	$ 3,000	
Spare parts & standby equip.	26,000	
Misc.	$ 50,000	
Expense sub-total	$128,000	$128,000
TOTAL		$218,000

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[1] Estimated $80,000 for antenna, $10,000 installation.

3. CBLFT - Channel 76 - Kitchener

Existing Equipment

Transmitter:	Marconi B7320, 10 kw
Antenna:	RCA TFU-24DAS, power gain 24
Transmission Line:	RCA Universal 6 1/8", efficiency 80%

Change channel 76 to 66

Replace Antenna	$100,000[1]	
Capital Sub-total		$100,000
Transmitter Changes		
Klystron replacement	$ 23,000	
Filterplexer replacement	25,000	
Harmonic filter	1,000	
Monitoring equipment mod	$ 3,000	
Spare parts & standby equip.	26,000	
Misc.	$ 50,000	
Expense sub-total	$128,000	$128,000
TOTAL		$228,000

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[1] Estimated $90,000 for antenna; $10,000 for installation.

Future Cost Calculations

1. CITY-TV - Channel 79 - Toronto

Capital Costs:

Replacement of Antenna $145,000

Capital costs in 6 years (6% inflation)
= 1.419 X $145,000 = $205,755

$$\text{Annual Charge} = (a/p)^{12\%}_{20} \times \$205,755$$
$$= .13388 \times \$205,755$$
$$= \$27,546.48$$

$$\text{PWAC} = \left[(p/a)^{12\%}_{20} - (p/a)^{12\%}_{10}\right] \times \$27,546.48$$
$$= 7.469 - 5.650 \times 27,546.48$$
$$= 1.819 \times 27,546.48 = \$50,107$$

$$\text{Future cost} = (f/p)^{12\%}_{10} \times \$50,107 = 3.106 \times \$50,107 = \$155,632$$

Expense

Expense sub-total	=	$162,500
Expense in 6 years	=	1.419 X $162,500 = $230,588
Total future costs	=	$155,632 + $230,588
	=	$386,220

2. CBEFT - Channel 78 - Windsor

Capital Costs

Replacement of Antenna $90,000

Capital cost in 6 years (6% inflation)
= 1.419 X $90,000 = $127,710

Annual charge = $(a/p)\ {}^{10\%}_{20}$ X $127,710
= .11746 X $127,710 = $15,000.82

PWAC = $\left[(p/a)\ {}^{10\%}_{20} - (p/a)\ {}^{10\%}_{10}\right]$ X $15,000.82
= 2.37 X 15,000.82 = $35,552

Future costs = $(f/p)\ {}^{10\%}_{10}$ X $35,552
= 2.594 X $35,552 = $92,222

Expense

Expense sub-total = $128,000

Expense in 6 years = 1.419 X $128,000 = $181,632

Total future costs = $92,222 + $181,632

= $273,854

3. CBLFT - Channel 76 - Kitchener

Capital Costs

Replacement of Antenna $100,000

Capital cost in 6 years (6% inflation)
= 1.419 X $100,000 = $141,900

Annual Charge = $(a/p)\ {}^{10\%}_{20}$ X $141,900
= .11746 X $141,900 = $16,667.57

PAWC = $\left[(p/a)\ {}^{10\%}_{20} - (p/a)\ {}^{10\%}_{10}\right]$ X $16,667.57

= [8.514 - 6.144] X $16,667.57
= 2.37 X $16,667.57 = $39,502

Future costs = $(f/p)\ {}^{10\%}_{10}$ X $39,502
= 2.594 X $39,502 = $102,468

Expense

Expense sub-total = $128,000

Expense in 6 years = 1.419 X $128,000 = $181,632

Total future costs = $102,468 + $181,632

= $284,100

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