

CANADIAN MUNICIPALITIES AND THE REGULATION OF
RADIO ANTENNAE AND THEIR SUPPORT STRUCTURES

This study was performed pursuant to Research Contract 36100-7-0027 between the Department of Communications for Canada and the University of New Brunswick (U.N.B.).

Principal Investigator was Professor David Townsend of the U.N.B. Faculty of Law.

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PREFACE

Radio antennae and their supporting structures are the most visible features of the physical manifestations of a vast network of mass-media, commercial and private radiocommunications systems which integrally affect the economic, social and cultural development of this country. Since the first two external antennae in Canada were approved in 1901, their number has steadily grown until there are approximately 230,000 licensed antennae in Canada today. ^{1/} Townsend, David

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Traditionally, accorded rather low regard is the extent to which the antenna may negatively impact upon the community near which it may be located. Despite the potential for negative health, safety and aesthetic impact, most antennae are sited with little or no regard to the quarter. Indeed, the history of the siting of broadcasting facilities is very much a study of local pressures for more, larger facilities.

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Recently, attitudes about the appearance and safety of the local environment have begun to change. Residents and municipalities are beginning to demand that local interests be considered within the siting process. Local and area land-use planning has evolved to take into account the impact of radio facilities. Today, almost all buildings, structures and facilities within municipal boundaries are planned in consultation with the community so as to minimize any undesirable impact.

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Constitutional authority over certain buildings, structures and facilities is vested exclusively with the federal or provincial governments. When these are to be sited within a municipal district, a formal or informal consultative mechanism is usually in place so that local opinions and interests will play a significant role within the authorization process, either as relevant or controlling factors for consideration.

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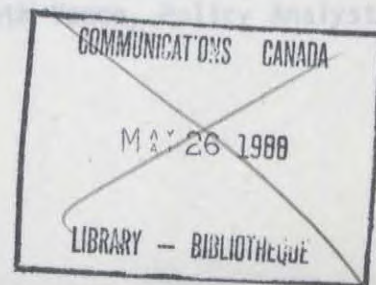
PREFACE

Radio antennae and their supporting structures are the most visible features of the physical manifestations of a vast network of mass-media, commercial and private radiocommunications systems which integrally affect the economic, social, political and cultural development of this country. Since the first two external antennae in Canada were approved in 1901, their number has steadily grown until there are approximately 230,000 licensed antennae in Canada today. Most antennae, whether licensed or licence-exempt, are sited (location, height, antenna system and tower type) with the fullest regard to the technical issues which affect their ability to radiate and/or receive radio signals. Traditionally, accorded rather low regard is the extent to which the antenna may negatively impact upon the community near which, or within which, it may be located. Despite the potential for negative health, safety and aesthetic impact, most antennae are sited with little or no objection from any quarter. Indeed, the history of the siting of broadcasting antennae in Canada is very much a study of local pressure for more, larger and more powerful facilities.

Recently, attitudes about the appearance and safety of the local environment have begun to change. Residents and municipal governments have started to demand that local interests be considered within authorization processes when facilities which can negatively impact upon them may be located in their midst. Local and area land-use planning has evolved to a highly developed state. Today, almost all buildings, structures and facilities which are to be located within municipal boundaries are planned in advance and integrated into the community so as to minimize any undesirable impact.

Constitutional authority over certain buildings, structures and facilities is vested exclusively with the federal or provincial governments. When these are to be sited within a municipal district, a formal or informal consultative mechanism is usually in place so that local opinions and interests will play a significant role within the authorization process, either as relevant or controlling factors for consideration.

(i)



Currently, when radio antennae are located and erected in this country, no consultation occurs and municipalities, with increasing frequency, are requesting that the federal government clarify the extent to which local by-laws may regulate radio antennae and their support structures. In March of 1987, the federal Department of Communications commissioned this study to provide the historical, technical, political and legal background material necessary to provide an answer to this question. Objectives set for the project required that it culminate with detailed guidelines which would be of assistance to municipalities desirous of drafting by-laws which relate to the siting and operation of radio antennae.

The study was performed during May and June of 1987. Over that period, a number of cities were visited and over 30 persons, representing federal, provincial, municipal and industry interests, were interviewed. Research was performed at the Faculty of Law of the University of New Brunswick and at the Department of Communications headquarters in Ottawa.

I am grateful to Mary Hatherly, Professor of Constitutional Law at the University of New Brunswick, who performed consultant services under the contract and drafted the section on the constitutional division of powers regarding radiocommunication. Her work was assisted by David Cameron and Angela Crandall, both students-at-law at the University of New Brunswick. Linda Hansen, of the University Archives section of the Harriet Irving Library at U.N.B., researched 85 years of radiocommunication history using parliamentary and archival sources.

As Principal Investigator, I accept full responsibility for omissions or inaccuracies.

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July, 1987

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TABLE OF CONTENTS

	<u>Page</u>
PREFACE	(i)
ACKNOWLEDGEMENTS	(iii)
I. GENERAL INTRODUCTION	1
II. INTRODUCTION TO RADIO ANTENNAE AND THEIR SUPPORT STRUCTURES ..	5
The Radio Spectrum	5
Frequencies and their Use	6
Antenna Site Selection Criteria	9
(a) Size requirements	9
(i) Support Structure	9
(ii) Service Type	9
(iii) Directivity of Signals	9
(b) Soil Type	10
(c) H.A.A.T.	10
(d) Availability of Electrical Power	10
(e) All Weather Access Road	11
(f) Future Development of Surrounding Environs	11
(g) Site Landscaping	12
(h) Co-location with Other Radio Services	12
(i) Airport Height Restrictions	12
(j) Land Use Planning Restrictions	13
Antenna Support Structures	14
(a) Types	14
(b) Structure Choice	14
(i) Economics	15
(ii) Site Size	15
(iii) Load and Capacity	15
(iv) Aesthetics	15

TABLE OF CONTENTS (cont'd)

	<u>Page</u>
Municipal Concerns and Antenna Technology	16
(a) Aesthetic Improvements	16
(i) TVRO Dish Design	16
(ii) Down-sizing of Satellite Dishes	17
(iii) Antennae Multiplexing	17
(iv) Antenna Combiners	17
(b) Technology and the Prospects for More Antennae	17
(i) Expansion of the AM Band	18
(ii) Cellular Telephone	18
(iii) Satellite Service Developments	18
(iv) New Broadcasting Services	19
The Federal Authority Over Radio Antennae in Canada	20
(a) Statutory Authority	20
(b) The Realities of Federal Antenna Regulation	28
(i) Interference Management	28
(ii) Location of Antennae	30
(iii) Height of Antennae	30
(iv) Co-location of Antennae	31
(v) Safety Regulations	32
(1) RF Emission Exposure Limits	32
(2) Aeronautical Obstruction Regulation	32
(3) Structural and Electrical Regulation	33
(vii) Aesthetics	36
(viii) Environmental Impact	38
(ix) Consonance with Local Planning	41
III. AN ANALYSIS OF CONSTITUTIONAL JURISDICTION IN RELATION TO RADIOCOMMUNICATION	44
Introduction	44
The Nature of the Interests Involved	45
The Present Constitutional Framework	49

TABLE OF CONTENTS (Cont'd)

	<u>Page</u>
Jurisdiction over Radiocommunications	55
(a) Federal Jurisdiction	55
(b) Provincial and Municipal Jurisdiction	68
The Case for a Greater Municipal Role	77
IV. REGULATION OF RADIO ANTENNAE AND THEIR SUPPORT STRUCTURES IN THE U.S.A.	87
Constitutional Division of Authority of Matters Affecting Radiocommunications	87
Constitutional Principles and Rules	88
The Regulatory Realities	89
(a) The Powers of the Federal Government	89
(i) Interference Management	89
(ii) Location of Antennae and their Structures	90
(iii) Height of Antenna and Support Structures	92
(iv) Co-location of Antennae	92
(v) Environmental Impact	93
(vi) Safety Regulation	94
(vii) Aesthetics	95
(viii) Express Preemption of Local Regulation of Antennae	95
(b) The Powers of Municipal Governments	97
(i) Location of Antennae and their Structures	97
(1) Antenna Moratoriums	97
(2) Zoning Control	97
(3) Co-location of Antennae	98
(4) Set Back	98
(ii) Height of Antenna and Support Structures	99
(iii) Safety Regulations	99
(1) R.F. Energy Exposure Limits	99
(2) Structural Adequacy	100
(3) Construction Safety	100
(4) Site Security	100
(5) Site Size	101

TABLE OF CONTENTS (Cont'd)

	<u>Page</u>
(iv) Aesthetics	101
(1) Design of Support Structure	101
(2) Colour of Antenna or Support Structure	101
(3) Screening/Landscaping	102
(4) Siting Requirements	102
(v) Other Regulations	102
Conclusion	103
V. GUIDANCE FOR MUNICIPAL BY-LAWS	104
VI. CONCLUSION	107

I. GENERAL INTRODUCTION

Radiocommunication, by its very nature and definition, involves the creation, transmission and reception of radio frequency energy which travels through space from one radio apparatus to another without artificial guides such as wires or cables.¹ While the frequency, power, type, size, shape, height and support structure of the particular radio antenna involved may vary a great deal, an antenna is required at both the point of transmission and reception of the radio energy. For over 55 years it has been a settled matter of Canadian constitutional law that the technical regulation of the properties and characteristics of both the transmitting and receiving devices, antennae included, is exclusively within the legislative authority of the federal government.

Almost invariably, municipal governments in Canada possess authority, delegated from their respective provincial government, to regulate the health, safety and aesthetics of buildings and other structures within the confines of their physical boundaries. Such land use regulation is achieved through the use of plans, by-laws and other rules which are legally enforceable upon those who wish to develop private property within the municipality. Legally speaking, municipalities possess only such power as is expressly delegated to them and provincial governments may only delegate powers with which they are lawfully vested.

The siting, construction and operation of radio antennae can, in some cases, cause substantial health, safety, economic, environmental and aesthetic concerns for those who live and work in close proximity to them. Some of these concerns are specifically addressed through existing federal regulation, but many are not. Historically, in relation to radiocommunications, the federal government through its various agents (currently the Department of Communications), has been concerned primarily with ensuring that all authorized

¹ Both domestic and international law define radio or radiocommunication in these terms. See: Radio Act, R.S.C. 1970 c.R-1 s.2(1) and International Telecommunication Union, General Regulations, c.1 Art.1 ss.1.3 and 1.4.

radiocommunication systems operate effectively and efficiently within the technical limits imposed by the radio frequency spectrum.

For some time, and with increasing frequency, municipalities, their provincial and national associations and some provincial government departments have complained that, on occasion, the siting and operation of certain radio antennae have resulted in substantial impact at the local level which the federal regulatory process has not taken, or adequately taken, into account.² They have responded by asking the Department of Communications to explain the legal limits of its jurisdiction over radiocommunications so that they may determine if the Canadian constitution has reserved to provincial governments, authority which could be delegated to local governments to minimize or eliminate the undesirable impact caused by the siting and operation of particular radio antennae.

For over a decade, the Department of Communications has responded to requests for clarification on their constitutional authority by citing from a legal opinion rendered by the Federal Department of Justice on this issue in the mid 1970's. It is stated in part:

2

While the issue is not truly within the scope of this study, it should be noted that, on occasion, those who own and operate radio antennae have complained that municipal planning has been undertaken without sufficient regard to the impact the local authorization process will have upon the operative capacity of the existing radio facility. As will be explained within this project (infra p.11) some radio facilities are quite vulnerable to future development which can disrupt or obstruct radio signals. When such has occurred in the past, municipal officials have not been sensitive to the plight of the radio operator. For example, when the Ontario Municipal Board (OMB) was holding public hearings on extensive changes to the official plan for the City of Oakville, Ontario the existing AM radio broadcasting facility (CHWO Radio Station and CJMR Community Broadcasting) attempted to tender evidence about the resulting disruption to their signal, but their evidence was ruled out of order. The OMB chairman stated that only land use planning issues would be considered. The general facts surrounding the amendment of Oakville's official plan can be found in, Re Oakville Planning Area Official Plan, Amendments 28, 31 and 32 (1979), 9 O.M.B.R. 412.

"Since radiocommunications is a field exclusively within the legislative competence of the federal government, then a province or municipality does not have jurisdiction to enact legislation or pass by-laws respectively which relate directly to radiocommunications. However, a properly framed municipal by-law dealing with local zoning and relating only incidentally to radiocommunications may co-exist with federal legislation provided the by-law neither prohibits nor unduly restricts the conduct of radio services or the operation of federally licensed radio stations."
(emphasis added)

Accepting for the moment that this legal principle correctly states the current law, the problem with it is that it is too general to be of practical use to those who must draft constitutionally valid municipal by-laws. One cannot differentiate between direct or incidental relation or impact unless the federal interest surrounding the siting and operation of radiocommunications is explained in some detail. Such explanation has not been forthcoming because the extent and nature of federal interest in radiocommunications is tied to the effective and efficient use of the radio frequency spectrum and that may vary with the technical, legal and political issues which surround particular uses and even particular users of the spectrum.³ Therefore, if municipalities are to regulate incidentally to radiocommunications, they must be provided with general principles and explanatory material which incorporate these technical, legal and political issues as well as detailed information about the operational requirements of the particular categories of antennae and support structures which municipalities are interested in controlling for their local impact.

It is the purpose of this study to undertake this task. To achieve it, the paper is divided into the following components: General Introduction,

3

For example, the technical, legal and political issues which surround the siting and operation of an external (off-air) television receiving antenna, pale in significance to those related to the broadcast antenna and support structure which is needed to transmit an appropriate television signal. If the broadcaster is a member of the CBC television network, certain of these issues may take on more significance.

Introduction to Radio Antennae and their Support Structures, Analysis of Constitutional Jurisdiction in Relation to Radiocommunication, Regulation of Radio Antennae and their Support Structures in the U.S.A., Guidance for Municipal By-Laws, and Conclusion.

II. INTRODUCTION TO RADIO ANTENNAE AND THEIR SUPPORT STRUCTURES

The Radio Spectrum

Radiocommunication is made possible when a transmitter converts an intelligible message into radio frequency and radiates a signal through an antenna. Depending on the directivity of the antenna, the signal may radiate in all directions at once (omnidirectional) or it may, by design, cancel signal in some directions and intensify it in others.⁴ The signal travels or propagates through space via radio waves and at the point of reception another antenna collects the signal as electrical current. The current passes to a receiver which converts the energy into the original message. Communication devices and their antennae may be designed for one-way or two-way communication. The range of a radiocommunication is generally a function of the particular radio frequency used, the height of the antennae, the properties of the antennae employed, the power of the transmitter and the nature of the surrounding terrain. Of these factors, radio frequency is the most important determinant of the range for particular radiocommunications and, based upon the frequencies employed, the nature and siting of the antennae used will be very different.

Radio frequencies range from very low frequencies (VLF), at 3,000 waves or cycles per second (hertz) to extremely high frequency (EHF) at a high of 400 billion waves per second. The complete range of frequencies is called the radio frequency spectrum and government regulation of this precious resource in the public interest is called spectrum management. In its most general sense,

⁴ Both transmitting and receiving antennae may be directional. In Canada, over 70% of the transmitting antennae used for AM radio broadcasting have directional properties. An example of a directional receiving antenna is the yagi type used for off-air colour TV reception. It resembles a flat fish-bone like structure.

spectrum management is interference⁵ management. While co-ordinating its efforts internationally, the federal Department of Communications plans, authorizes, adjusts and polices the use of the radio spectrum for the orderly development of radiocommunications.⁶ Because the spectrum is a shared resource (shared domestically and internationally), these objectives charge the Department to attempt to maximize the total number of users of the spectrum while ensuring that each user suffers no greater radio interference than is considered permissible for each user's service category.

Frequencies and their Use

As stated above, the critical determinant for the distance a radio-communication travels is the frequency employed. Different frequency and antenna combinations will tend to concentrate signal skyward (skywave), directly outward (direct waves) or along the contours of the ground (groundwaves). Different frequencies behave very differently when they interact with the earth's atmosphere. Some travel through with little difficulty, some are badly affected by adverse weather conditions and some will be reflected back to earth (once or repeatedly) and, thereby, travel great distances across the surface of the earth. These natural propensities, when advantageous to radiocommunications, can be significantly enhanced by the type of antenna used and the circumstances surrounding their siting.

5 The term interference has specific technical meaning. As employed here, however, it means any significant disruption to radiocommunications or to the operation of certain non-radio devices.

6 The Department of Communications authorizes such things as frequencies, bandwidth, type of emission, power, antenna properties and height, technical standards for radio equipment and operator proficiency.

Table 1

<u>Frequency Type</u>	<u>Frequency⁷ Range</u>	<u>Wave Length (at upper limit)</u>	<u>Range and Uses</u>
VLF (very low)	3-30 kHz	10 km	- long range. Radionavigation and Marine
LF (low)	30-300 kHz	1 km	- same as above
MF (mid)	300 kHz-3 MHz	100 m	- commonly used from 160-400 km (depending on power and atmospheric conditions). AM Radio, Amateur, Marine and Radionavigation.
HF (high)	3 MHz-30 MHz	10 m	- commonly used from 320 to thousands of km (depending on power and atmospheric conditions). International communications, Short Wave, Amateur and Citizen Band ⁸
VHF (very high)	30 MHz-300 MHz	1 m	- from 16-80 km. VHF-TV, FM radio, Municipal Services ⁹ , Aeronautical, Amateur

7 One thousand cycles or hertz is one kilohertz (kHz), one million hertz is one megahertz (MHz) and one billion hertz is one gigahertz (GHz).

8 Citizen Band is also called General Radio Service (GRS). The range of CB or GRS is between 60-80 km which is in part due to severe power restrictions.

9 The categorization Municipal Service is not an internationally recognized service designation. It is used here to include all municipal-type services whether offered by a municipal, provincial or federal government. The services include radio services for detention centres, emergency response, government administration, hospitals, parks, police, public works, museums, nursing homes, schools and universities and utilities. Such services are almost invariably of the Land-Mobile type.

Table 1 (cont'd)

<u>Frequency Type</u>	<u>Frequency Range</u>	<u>Wave Length (at upper limit)</u>	<u>Range and Uses</u>
UHF (ultra high)	300 MHz-3 GHz	10 cm	- up to 80 km. UHF-TV, Municipal Services, Commercial Common Carriers, Cellular Radio, Amateur
SHF (super high)	3 GHz-30 GHz	1 cm	- up to 80 km by direct wave or up to several thousand km if the signal goes via satellite ¹⁰ . Satellite, Terrestrial Microwave, Radar, Amateur
EHF (extremely high)	30 GHz-300 GHz	1 mm	- almost unlimited in space ¹¹ . Satellite, Radar, Amateur, Radio Astronomy

10

By use of a satellite the distance across the surface of the earth can be up to several thousand km, but the absolute distance in space is almost unlimited. For example, when Voyager 2 transmitted information about the planet Uranus, its signal travelled nearly 3 billion kilometers.

11

Radio Astronomy has been used to receive radio signals from quasars billions of light years from earth.

Antenna Site Selection Criteria

Other than the cost of a site which will be a function of its size, location and other market value determinants, there are a number of other factors which affect the selection of an antenna site.

- (a) size requirements - these are a function of the type of antenna support structure used, the type of radio service the site is for and the antenna type.
- (i) support structure - many antennae are mounted on towers or other support structures designed for this purpose. Generally, the length and width of the site must be 20 to 25% of the height of an antenna if the structure is free-standing and between 50 to 80% of the height if the support structure is to be guyed down.¹²
- (ii) service type - some radiocommunication services require very large sites due to the particular type of antenna required. For example, a short wave antenna for international broadcasting may require up to 500 acres of land.
- (iii) directivity of signals - depending upon the frequency used, directional antenna can become quite elaborate, consequently increasing the site requirements. For example, a highly directional amateur antenna may need more and further spaced guy lines. Also, a highly directional AM radio antenna may require up to 12 independent antenna towers, each requiring many guy lines.¹³

12 For guyed towers, sizes less than 50% of the height of the tower can be used but the cost of the support structure rises dramatically due to engineering difficulties.

13 A recent application from CFGM radio in Richmond Hill, Ontario to locate a directional AM broadcasting antenna in Beamsville, Ontario involves 8 towers and requires 80 acres of land.

- (b) Soil type - all radio antennae must be grounded to protect against a lightning stroke which could damage equipment and possibly set fire to structures nearby. If the soil is very rocky or for other reasons unconductive, the cost of the ground system can be prohibitive. Grounding is also critical for the generation and integrity of the radio signal for some radio services. For example, AM radio requires an extensive ground screen which may involve hundreds of cables which are buried just below the soil surface. For an AM broadcasting antenna location, the soil should have characteristics which are commonly found in good agricultural soil.
- (c) H.A.A.T. - height above average terrain is a critical site selection factor for the majority of radio services (those which rely on line-of-sight propagation). The signal will travel farther and suffer less obstruction when the antenna is mounted as high as practicable. Therefore, to avoid the cost of tall towers many antennae are sited on mountains and hills or atop existing structures like buildings or water towers. Also, radio signals generally will not pass through and most will not pass up and over obstructions, either man-made or natural. Therefore, a mountain located centrally to a large population may be a critical site as it will likely produce a tremendous signal shadow even if a tall tower is constructed elsewhere.¹⁴
- (d) availability of electrical power - while some transmitters have in the past been operated by diesel power and some low power microwave stations can operate on solar power, antenna installations are almost invariably connected to electrical power. If power must be brought into the site, the cost for the siting can climb dramatically. Sites are selected with this in mind. Also, broadcasting transmitters often require three-phase power to provide adequate capacity to the system and to avoid background noise from the power itself. (This can be suppressed, but at a cost.)

¹⁴ An excellent example of this situation is Mount Royal Park in Montreal. To get city-wide coverage, TV broadcast transmitters must be atop that mountain.

- (e) all weather access road - for servicing antenna sites, but especially when constructing sizable support structures, a proper road is a necessity.¹⁵ Due to the high cost of land and the construction and maintenance costs of such roads, sites are almost always acquired as close as possible to existing public roads.¹⁶
- (f) future development of surrounding environs - many radio services are vulnerable to facilities and structures which may be located nearby subsequent to the construction of their own facilities. To illustrate, buildings and large amounts of metal will distort AM signal patterns, microwave relays can be cut off between towers and an electric power line corridor may cause substantial interference.¹⁷

15 For large towers the parts must be transported in sections, assembled at the site and erected with a crane. While some towers are brought into isolated areas and erected with the use of helicopters, due to the costs involved this is for exceptional circumstances.

16 For the reasons cited above, high ground proximately located to the TransCanada Highway was chosen for much of the route of the first series of microwave relay stations across Canada. As a general rule, those who wish to construct transmission facilities would not acquire a site if the public roads were merely proposed for the area as no authority could be used to force the construction of the road if a local government objected to the proposed location of the transmitter.

17 In some circumstances the common law of nuisance may offer protection for broadcasting undertakings which suffer interference when power lines locate so as to spoil the reception on transmission of their signals. See: Nor-Video Services Ltd. v. Ontario Hydro (1978), 19 O.R. 107 (Ont. H.C.). In addition to the concerns discussed above, those with powerful transmitters are considering the implications of recent legal precedent involving complaints by local residents about the smell and dust from a piggery in New Brunswick. In the Sullivan Case, damages were awarded against a pig farmer despite the fact that he had been carrying on his operation long before the surrounding area became residential in nature. Radio operators are concerned that the safety level of the RF emissions from their transmitters, or the interference they may cause to radio and non-radio devices, may be similarly challenged by those who move in around them. See: Desrosier et al. v.

- (g) site landscaping - a site which is to support a free-standing or a guyed tower must be flat or the cost of engineering the support structure may make the site too expensive. For very large sites, preparation costs may exclude some sites from consideration.
- (h) co-location with other radio services - generally, the transmitters and antennae of some radio services can be located in close proximity to each other while others may not - or may require expensive shields or filters. In fact, it is easier from a radio interference standpoint, to co-locate certain TV and FM facilities if their antennae are mounted on the same tower or support structure as opposed to one nearby.¹⁸ On the other hand, there is great potential for harmful interference when certain FM radio facilities are located near aeronautical radio equipment at airports and such location arrangements are often avoided. Also, AM radio installations frequently must be located a good distance from each other.¹⁹
- (i) airport height restrictions - the rules requiring the painting and lighting of antennae designated as possible aeronautical obstructions (to

Sullivan and Sullivan Farms (1986), 66 N.B.R. (2d) 243 (Q.B.); aff'd (1986), 76 N.B.R. (2d) 271 (C.A.); leave to appeal to S.C.C. refused June 1, 1987.

- 18 For example, another communication tower located nearby will often cause ghosting and other interference problems for TV reception. Controlling for such problems can be expensive and involve the cooperation of those in control of other radiocommunication systems.
- 19 Special circuits can be added, in some cases, to permit closer placement of AM stations but this can be difficult and costly.

be discussed) substantially add to the cost of antenna installations, especially for large structures in close proximity to an airport.²⁰

- (j) land use planning restrictions - despite or because of the uncertainty of the legal status of provincial or municipal land use restrictions, which relate to radiocommunication facilities, the existence of such continues to be a site selection factor. Generally, engineering consultants recommend against siting extensive radio facilities in an area where land use restrictions expressly attempt to prohibit them. The cost and delay incurred and the bad publicity generated by a direct challenge to such regulations usually cause prudent individuals either to look for a site where the installation is expressly or by implication permitted, or to obey the requirements as set out.²¹ Also, when radiocommunication installations involve the siting and construction of ancillary structures such as production studios or satellite teleport buildings,²² there

20 The cost of the high intensity white lights can be in excess of \$10,000.00 each and it is very expensive to maintain painted obstruction markings once an antenna structure is erected.

21 Those who wish to site large, expensive radio facilities tend to follow the 'path of least resistance' when acquiring antenna sites. Therefore, land use regulation problems are avoided where it is reasonably possible to do so. For example, CANTEL is currently acquiring sites for a cellular corridor between Windsor, Ontario and Quebec City. Antennae located in rural areas will be up to 95 meters tall. The company has adopted a policy of applying for permission to construct (building permit) from the local government for each site they have arranged to purchase or lease.

22 Satellite teleport or radioport facilities are being constructed by Telesat Canada. They involve co-location of many satellite antennae and satellite services. Typically, teleport installations involve between seven to ten parabolic dishes, sized from 1.8 to 10 meters in diameter, mounted upon the roof of a warehouse-like structure. It is this warehouse which is under local jurisdiction and by-law control. Currently, five teleport and ten radioport sites have been constructed by Telesat. They are within major metropolitan areas.

is little doubt that these structures can be regulated like any other building within a municipality. Therefore, restrictions which relate to such ancillary structures may discourage the siting of an antenna.

Antenna Support Structures

Supporting structures perform two purposes. First, quite obviously, they elevate and support the radiating element for a radiocommunication system. Second, they may also radiate signal themselves as is the case for AM radio towers.²³

(a) types²⁴ - there are two principal types of supporting structures for radio antennae. They are the self-supporting type and the guyed mast type. Self-supporting towers are square, triangular or pyramidal in shape (viewed from cross-section). They may be constructed of tubular steel, steel lattice, reinforced concrete and, on occasion, wood.

Guyed mast structures are made of tubular steel, latticed steel and (infrequently) aluminum. They are held in place by many guy wires. Although their central column may take far less space on the ground than a self-supporting tower, the guy lines require several acres of land to secure the structure.

(b) structure choice - the selection of one type of support structure, or one type of construction material, over another depends upon economic, technical and engineering factors.

23 For AM broadcasting towers, the entire structure is the antenna.

24 Much of the material concerning the types and uses of support structures is taken from information provided at a half-day seminar entitled "The Design of Communication Towers and CSA Specification S37-M86" sponsored by the communications firm of Leblanc & Royle Telecommunications Inc. and held in Ottawa on 25 June 1987.

- (i) economics - self-supporting towers are more expensive than the guyed variety and very costly when they exceed 95 meters in height. Reinforced concrete is the most expensive construction material with aluminum being the second most expensive.
- (ii) site size - free-standing structures require much less land than guyed towers. In urban areas, the high cost of land and its general lack of availability may dictate the use of a self-supporting structure. In rural areas, a guyed tower becomes more practical.²⁵
- (iii) load and capacity - due to the weight of equipment, or the preponderance of antennae, a self-supporting structure with its stronger central column is often chosen over the guyed type.²⁶ For both of these reasons, the CN Tower in Toronto is free-standing and constructed of reinforced concrete.
- (iv) aesthetics - the selection of type of structure and construction materials can effect how aesthetically disruptive or pleasing it is. A guyed tower is generally less obtrusive, at a distance, than is a free-standing one, with its larger base and bulkier members. On a number of occasions in Canada reinforced concrete, while

25 The support structures for cellular radio corridors and for microwave relay systems often follow this pattern and site guyed towers in rural areas and self-supporting ones in urban locations.

26 The new antenna (two UHF-TV channels) added last summer to the self-supporting tower atop Mount Royal in Montreal weighed nine tons. It joined two VHF-TV antennae and four FM antennae on the same structure. FM antennae may weigh up to 3,000 pounds and coaxial cable can range between fifteen to thirty pounds per linear meter.

admittedly bulkier, has been used because of the architectural possibilities it offers.²⁷

Municipal Concerns and Antenna Technology

Technological advances have made a rather limited response to the local issues being raised by municipalities in Canada. While certain aesthetic-related improvements have made some antennae less obtrusive and permitted others to be more easily co-located, developing technology and radio policy likely will give local governments more cause for complaint in the future.

- (a) Aesthetic improvements - there are at least four instances where recent advances in radio science can or will respond to local concerns.
 - (i) TVRO dish design - it is now possible (though more costly) to construct satellite dishes for residential areas which have a much flatter presentation. Some can be recessed into the roof of an existing structure and the latest design can be wall mounted and painted to match its background.²⁸ Also, for some time parabolic dishes fabricated of black wire mesh, which is far less obtrusive than solid materials in other colours, have been available on the market.

²⁷ It is not unusual for microwave towers which are sited at the downtown location of a telephone company to be made of concrete for this reason. In British Columbia, when residents complained about a microwave tower planned by B.C. Tel, the utility installed the antenna into a sculpture-like structure, sited it on a hillside, and permitted a local church to erect a cross upon it. Aesthetic factors are another reason why the CN Tower is made of concrete.

²⁸ See: "Flat Satellite Antenna Developed", Signal Magazine, Vol. 4 No. 2 June/July 1987 (at p.38). This antenna uses a foam core design to collect the signal.

- (ii) Down-sizing of satellite dishes - when parabolic dishes were first used for satellite radiocommunications, they were thirty meters in diameter. The technology of higher frequencies and more powerful satellites has permitted the size of dishes to be dramatically reduced.²⁹ (But, this has also made them more affordable for business and home use.)
 - (iii) Antennae multiplexing - advances in antenna technology, especially for Land-Mobile antennae, has permitted many antennae to be incorporated, hence co-located, into one piece of hardware. Up to 12 land-mobile systems can be accommodated on one multiplexed or multicoupled antenna and up to 20 can use one pair of these elements.
 - (iv) Antenna combiners - improvements in radio electronics now permit several broadcasting transmitter signals to be combined and fed into one antenna. Under ideal conditions a number of FM and TV signals can be combined and a multiplicity of antenna towers and antennae can be avoided.
- (b) Technology and the prospects for more antennae - there is little doubt that the complaints recently expressed by local governments will continue to grow in number until some way is found to site antennae in a manner more sensitive to municipal interests. This is especially true if the number of complaints is proportional to the number of antennae sited. Changes in technology and radio policy will see a number of new services introduced which will cause a steady increase in the number of antennae within municipal boundaries.

²⁹ Certain parabolic dish antennae may have to increase in size in the future as more and more satellites are placed in geostationary orbit around the earth. As key orbital positions become more congested, interference problems may develop which will require larger dishes to collect more of the desired signals.

- (i) expansion of the AM Band - at a recent world radio conference it was agreed that the AM radio band would be expanded from 1605 to 1705 kHz. For Canada this will mean the possibility of 100 new AM stations of relatively low power. Presumably the siting of these antennae will begin as soon as receivers which can tune to these stations are commonly available.

- (ii) cellular telephone - radio telephones which have ready access to the public-switched network are now available in a number of major Canadian cities³⁰. This technology requires that a city be divided into a number of radio zones or cells, each with its own transmitter and antenna. In urban areas these rather bulky antennae are sited about 30-40 meters above the ground and a number of them are required to serve a major metropolitan area. Cellular corridors, like the one between Edmonton and Calgary and the one under construction between Windsor and Quebec City, permit access to the telephone network while travelling along or near to the main highway. A very real problem for rural municipal governments is that they must bear the undesirable aspects of antennae that are up to 125 meters high, yet their citizens will not likely be the ones with cellular phones in their vehicles.

- (iii) satellite service developments - there are a number of changes anticipated for satellite services which will impact on local municipalities. First, with the launch of two ANIK E satellites by Telesat Canada in 1990, direct broadcasting via satellite will be available to citizens who possess a receiving dish which will be between 1 and 1.4 meters in diameter. Second, commercial use of satellite communications is likely to grow at an astounding rate.

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Cellular phones were first introduced into Canada in July of 1985 by Cantel Inc. and Bell Cellular. At the time of writing, Cantel serves 21 Canadian cities, is working on two cellular corridors and plans to offer cellular service in Halifax by November of this year and in Winnipeg next year.

VSAT or Very Small Aperture Terminal, with their capacity to transmit large amounts of data, may soon be sited on many commercial and industrial buildings. ANIK E satellites will offer a number of telephone, video and data communication services to the business community. Private satellite networks for convenience store chains and car dealerships, for example, may see such antennae sited in close proximity to, or within, residential areas. Third, the construction of satellite teleports and radioports by Telesat Canada has meant an increase in satellite dish sitings and, in some cases, services which used to be located outside of major urban centres have now moved downtown to the radioport. Fourth, currently being discussed in Canada is the possibility of moving CBC onto the satellite ANIK C-1. This would mean that Canadian programming will be available on three Telesat satellites instead of two and most cable TV companies, and anyone else interested in receiving these programs, would need to site another dish on their property.³¹

- (iv) new broadcasting services - the Department of Communications and the C.R.T.C. are currently developing policy for a new broadcast-type³² service using low power transmitters. These are called Multi-channel Multipoint Distribution Systems (MMDS) and Multipoint Distribution System (MDS). MMDS will permit a cable TV type of

31 Currently, cable TV operators in Canada have at least three satellite dishes sited on their property. One for each of the 'birds' with Canadian TV programming on them, ANIK C-3 and ANIK D-1, and a third to receive programs from an American satellite.

32 This phrase has been employed because it has not been settled as to whether MDS, which does not transmit entertainment services, amounts to broadcasting or should be given another radio service designation.

operation -- but without the cable³³. From one location, using microwave frequencies, all 15 available MMDS TV channels can be transmitted to area homes. Such operations, planned for rural areas,³⁴ will involve one transmission antenna and a number of satellite and other antennae to receive the signals for distribution. MDS is similar to the system described above except that it transmits only one channel. It is anticipated that it will be used to transmit (or broadcast) specialty information services to commercial clients within a certain geographical location. Because they operate at microwave frequencies and broadly transmit their signals, such antennae will need to be centrally located at a high elevation above obstructions and the average terrain.

The Federal Authority Over Radio Antennae in Canada

(a) Statutory Authority

As stated in the introduction to this study, the spectrum management functions of the federal Department of Communications (DOC) require the department to plan, authorize, adjust and police the use of the radio frequency spectrum to ensure the orderly development of radiocommunications for the nation and to co-ordinate those efforts internationally. This involves, as a principal objective, maximizing the total number of legitimate users of the spectrum while controlling the radio interference each user may suffer. To achieve this objective, DOC must have jurisdiction over such things as; radio frequencies, bandwidth, emissions, and power and direction of the signal; time of operation and station identi-

33 Some are calling this new service "cable in the sky".

34 An MMDS undertaking is currently being installed in a rural area of Quebec pursuant to a joint DOC-Quebec Ministry of Communications agreement. See: Network Newsletter, Vol.7 No.22 15 June 1987 (at p.6). This proposal involves the simultaneous transmission of four entertainment channels from one transmitter site.

fication; technical standards and other requirements for radio apparatus; antenna location, height, type and other properties; and, in some cases, operator proficiency. Spectrum management also involves issues of national defence³⁵, sovereignty³⁶ and public policy (such as those related to national and cultural identity³⁷ and regional development).

To perform its spectrum management functions, the Department of Communications must possess the legal mandate to: enter into

35 The Department of National Defence has of the most radio spectrum allocated and assigned to its use than any other user, public or private, in Canada.

36 The sovereignty issue referred to here is the legal jurisdiction to control the flow of radio transmissions across our borders. Without an authorization process, which can be granted and rescinded, the flow of commercial information would be very difficult to control. The Clyne Committee Report (Department of Communications, Consultative Committee on the Implications of Telecommunications for Canadian Sovereignty, Telecommunications and Canada, Minister of Supply and Services, (Ottawa: 1979) contained many concerns about our ability, legal and otherwise, to control the flow of computer data across our borders. As an aside, one sovereignty issue which the current Radio Act does not respond to, involves the transmission of intelligence using frequencies significantly higher than those of the radio portion of the electromagnetic spectrum. Enquiries already have been received about licensing requirements for such communications systems. The Radio Act is tied to radio technology and offers no control over such means of communication, unless it was causing interference to radio users.

37 On a number of occasions in the past, spectrum management policies have been used to achieve public policy objectives related to creating and fostering a national network for radio and television broadcasting. For example: frequencies were juggled and reassigned during the early years of AM radio to give the national broadcasting system the choice frequencies; signal power freezes were employed to favour public, over private, broadcasters; and signal contour rules were created to foster the introduction of radio and television into areas which did not promise a healthy market for private broadcasters.

international³⁸ (bilateral and multilateral) and intra-national³⁹ (between DOC and other governments and agencies within Canada) agreements; control radio services with general and user-specific policy; enforce its policies through a system of inspections and prosecutions; and deploy the resources⁴⁰ necessary to achieve all of the above. The mandate to control radio services with general and user-specific policy is the one with which this section of the study is most concerned, especially as such control relates to antennae.

Spectrum management policy regarding the establishment and operation of a radio service or station is contained within the Radio Act⁴¹, its various regulations⁴² and within a number of policy documents (which may or may

38 There is explicit authority to enter into international agreements in both the Department of Communications Act, (s.5(i)(f)) and the Radio Act (s.8(1)).

39 The Department of Communications Act, section 5(2), provides authority for intra-national agreements.

40 The dedication of resources to spectrum management by DOC is substantial. For the fiscal year 1985-86, 44.5 million dollars and 872 person years were deployed for this purpose. Costs were recovered through radio licence fee revenues.

41 R.S.C. 1970, c.R-1 (as amended) Statutory authority for spectrum management functions can also be found in the Department of Communications Act, Broadcasting Act and the Telegraph Act. Many spectrum management functions relate to providing support to legislative programs contained within the Fisheries Act, National Transportation Act, Canadian Merchant Marine Act, Aeronautics Act, Arctic Pollution Control Act, St. Lawrence Seaway Administration Act and the Gas and Petroleum Production and Conservation Act.

42 General Radio Regulations, Part I, C.R.C., c.1371., General Radio Regulations, Part II, C.R.C., c.1372., Radio Interference Regulations, C.R.C., c.1374., Radio Operator Certificate Regulations, SOR/78-244., and the Private Receiving Antenna Construction Order, C.R.C., c.1373. (There are also a number of schedules made under the regulations.)

not carry the force of law⁴³). The enabling authority within the Radio Act to regulate the establishment of a radio station is divided between broadcasting and non-broadcasting stations.⁴⁴ To establish a broadcasting undertaking⁴⁵ one requires a Technical Construction and Operating Certificate (TC & OC) from the Department of Communications (and to commence delivering programs, a licence is required from the C.R.T.C.).⁴⁶ For all other licensed radiocommunication services, a licence is the principal authorization certificate. Sections 4(b)(i) and (ii) of the Radio Act state, in part:

The Minister may ... issue ...

- (i) licences in respect of radio stations ... and
- (ii) technical construction and operating certificates ...

for such terms and subject to such conditions as he considers appropriate for ensuring the orderly development and operation of radiocommunications in Canada.

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- 43 The Department uses about ten different types of policy and guidance documents called policies, procedures, standards, rules, specifications, bulletins, circulars, equipment lists, system plans and manuals.
- 44 As is true for every other aspect of broadcast regulation, broadcasting antennae tend to receive far more attention than all other antennae sited for radiocommunications. In actuality, less than two percent of all licensed antennae sited in Canada are related to broadcasting undertakings.
- 45 Broadcasting undertakings include AM and FM radio, VHF and UHF-TV and cable operations.
- 46 The CRTC may not grant a licence under the Broadcasting Act unless the applicant has been issued or is about to be issued a TC & OC. See: Broadcasting Act, section 22(1)(b). The CBC is also bound by the precondition of a valid TC & OC for its broadcast undertakings as per section 30(3) of the Broadcasting Act. The CRTC is, of course, the Canadian Radio-television and Telecommunications Commission.

This section gives the Department a great amount of control over general policy related to radio service categories and/or specific control over an individual applicant for an authorization.⁴⁷ To establish, install, operate or possess a radio station without a valid licence or TC & OC is an offense under section 3 of the Act.⁴⁸

For broadcasting undertakings the enabling authority is more specific in regards to ministerial control over the establishment of a station than for other types of radio service. Section 5 of the Act states:

The Minister shall regulate and control all technical matters relating to the planning for and construction and operation of broadcasting facilities and without limiting the generality of the foregoing, he shall:

- (c) approve each site upon which radio apparatus, including antenna systems ... may be located and approve the erection of all masts, towers and other antenna supporting structures.

Therefore, the preceding section gives the Minister of Communications substantial control over all technical matters relating to the construction of broadcasting facilities and their antenna system, its location and support structure or tower.

For control over antennae generally, enabling authority to make

47 The control over specific licensees is clarified by section 4(c) which states that the Minister may, "amend the conditions of any licence or certificate [TC & OC] where he considers such amendment necessary ...".

48 The sanction for establishing, installing, operating or possessing a radio apparatus without a proper authorization is substantial. Section 11 provides for a fine of up to \$2,500.00 or imprisonment not exceeding one year and possible forfeiture of the apparatus involved.

regulations is contained within section 7(e) of the Radio Act. It prescribes that:⁴⁹

The Minister may make regulations:

- (e) respecting the installation, erection, construction or repair of antennae for radio stations and the appointment of inspectors for the enforcement and administration of such regulations ...

Regulations promulgated under this act further specify the Minister's control over the establishment of broadcast and non-broadcast radiocommunication systems. For all antennae subject to an authorization process, section 12 of the General Radio Regulations, Part II (G.R.R., Part II) provides for site-specific approval, and for control over the antenna system's support structures. It states:

- 12(1) No licence shall be granted for the installation and operation of a radio station unless the applicant has obtained the approval of the Minister for the proposed site and for the erection thereon, of masts, towers and other vertical structures related to the antenna system of the station; and the licensee shall, when required, paint and light any such

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It is interesting to note at this point that this is the principal enabling provision for control over all non-broadcast antennae yet it is silent with respect to authority to make further rules regarding site-specific approvals and control over the selection of an antenna system or support structures or towers. There is considerable legal authority on the rules for regulation-making which requires that every regulation must clearly be authorized by an enabling provision in the statute itself. Therefore, regulations with respect to these subjects, as such relate to non-broadcast antennae, may be ultra vires the Act unless some other legislative provision can be found to support them. It may be possible to uphold their validity by arguing that these provisions are authorized by section 3(1)(b) of the Radio Act. In other words, the Minister is employing his/her broad discretion to set licence conditions by putting them in regulation form. If the Radio Act is amended in the near future, this stretch of authority could be avoided by including an enabling provision, in the act itself, which authorizes the Minister to make policy rules related to the antenna system, site approval and support structures for all licensed antennae (not just those used for broadcasting undertakings).

structures, in accordance with the specifications approved by the Minister.

- (2) No change of approved site, masts, towers and other vertical structures related to the antenna system of any such station shall be made without further approval by the Minister.

Control over the selection of a particular antenna system is provided for non-broadcasting antennae in section 14(1) of G.R.R., Part II:

- 14(1) No licence shall be granted for the installation and operation of a radio station unless the applicant has obtained the approval of the Minister for the radio apparatus including the antenna system ...

For some reason, which is not immediately apparent, additional authority is specified for Ministerial control over the siting of antennae and over the support structures for private commercial broadcasting stations.⁵⁰

Section 117 of G.R.R., Part II sets out these powers:

- 117 The transmitter and associated equipment shall be of standard design and shall conform to the best current engineering practice; and the transmitter and the location, type, height, painting and lighting of the antenna structure shall conform to the requirements prescribed by the Minister from time to time.

The Act and regulations contain only one provision dealing directly with Ministerial control over the antenna system of unlicensed radio stations.

50 Private commercial broadcasting stations are radio, TV and cable operators which are not affiliated with the CBC. This provision may be left over from the very early years of radio regulation when the CBC regulated the technical parameters of its own stations. Currently, even with the authority vested in the CBC to "establish, equip, maintain and operate a broadcasting undertaking" (Broadcasting Act, s.39(1)(a)), the CBC, like the private stations, must possess, or be eligible for, a TC & OC from DOC before it can be issued a licence by the C.R.T.C. See: Broadcasting Act, s.39(3).

Section 13(1) of G.R.R., Part II, and the Order⁵¹ and Schedule⁵² created pursuant to it, provide control (rather anomalously) over the structural adequacy and other engineering features of private antennae and support structures used for domestic receivers which are sited within 18 municipal districts in Canada.⁵³ The antennae subject to enumeration and regulation would include all external antennae sited at private residences for unlicensed receivers (i.e. TV, radio, scanners and likely Television Receive Only (TVRO) dishes⁵⁴).

As can be seen from the material cited above, pursuant to the Radio Act and the regulations made under it, the Department of Communications (and its immediate predecessor in radio regulation, the Department of Transport) has been vested with statutory jurisdiction and subordinate legislative authority over the construction, location, site approval, type approval, erection, repair and operation of radio antennae and the

51 Private Receiving Antenna Construction Order, C.R.C., c.1373.

52 Schedule 1 of G.R.R., Part II (first enacted as Schedule A: Antenna and Supporting Structures for Domestic Radio Receiving Purposes, SOR/56-400, on 14 November 1956).

53 The engineering standards in the Schedule apply only to the districts enumerated in the Order. Over the 30-year history of this regulation, the number of districts has ranged from a low of about six to a high of eighteen. As will be seen in the following section of this study, the schedule has not been enforced in a number of years and is about to be repealed.

54 The definition within the preface to G.R.R., Part II defines a "private receiving station" as any receiver specifically exempted from licensing under section 3(3) of the Radio Act. Likely, the combination of this definition and the provisions in the Order would extend its application to include unlicensed TVRO dishes sited on "domestic" (residential) property. This would explain why a few municipalities recently have been writing to DOC asking about how they can be added to the schedule appended to the Order.

location, painting, lighting and engineering of antenna support structures in Canada.

(b) The Realities of Federal Antenna Regulation

In order to provide direction on how municipal governments may regulate in a manner incidental to, or unrestrictive of, the federal authority's regulation of radio antennae, it is necessary to know what the federal government actually does regulate pursuant to the legislative authority provided to it.

- (i) Interference management - controlling the levels and sources of interference to and from radio devices is, and has always been, the most important and prominent feature of spectrum management for the federal government. While the Radio Act itself is surprisingly silent on the issue of interference management⁵⁵, the various regulations created pursuant to it are replete with provisions and authority to control radio interference.⁵⁶ A case involving the tort of nuisance, currently on appeal to the Ontario Court of Appeal, may offer legal opinion on the degree of exclusivity of the federal government's jurisdiction to manage radio

55 See: Radio Act, s.5(e) regarding broadcasting undertakings. This is the sole provision.

56 The lack of a specific enabling provision in the Act, while problematic, is likely not fatal to the validity of the interference provisions embodied in regulation form. Managing interference through licensing was the raison d'être of the first radio legislation in Canada (the Wireless Radiotelegraph Act of 1905 per, R. Prefontaine, Minister of Marine and Fisheries, Commons, July 7, 1905 at p.9032) and has continued as such throughout successive efforts to regulate use of the spectrum. Be that as it may, if new Radio Act provisions are created in the future, an enabling provision should be specifically created for interference management authority.

interference. In the case of Houghtby v. Ravenscroft,⁵⁷ an amateur radio operator was sued by his neighbour for an injunction and damages due to interference to the neighbour's radio and non-radio household devices⁵⁸ caused by the amateur's radio transmissions. One of the grounds stated in the appeal filed on behalf of the amateur is that, under the constitution, the federal government has exclusive jurisdiction over any interference caused by a

57 Decided in the Ontario District Court on April 9, 1986, Judge W.T. Hollinger (unreported) (file no. 1559/85). The Ontario Court of Appeal likely will hear the case in November of 1987.

58 The non-radio devices included the neighbour's electronic organ and furnace controls. The issue of interference from licensed radio operators to non-radio devices complicated DOC action in this case and is causing inconsistent action in others. This is because the Radio Act speaks of interference to radiocommunications. Thus, the Department of Communications is uncertain of its jurisdiction to intervene when the performance of equipment such as telephones, VCR's, computers and electronic organs is seriously affected by radio transmissions. In the Ravenscroft situation the Department took no official action, due to concerns about its jurisdiction, but in two other recent cases DOC was not so inhibited. When Manitoba Television applied to site a television broadcasting transmission tower on the campus of the University of Manitoba, DOC turned down the application, in part, because of the potential for interference to non-radio medical devices at a nearby hospital. Also, when transmissions from an AM broadcasting station, CKCV Quebec City, caused substantial interference to the radio and non-radio devices in a municipality which was adjacent to the municipality in which the transmitter was sited, the Department of Communications responded by varying the terms and conditions of the broadcaster's licence. At one point the municipality brought a legal action against the Minister of Communications because of the interference its residents were suffering. See: Ville de Cap Rouge et. Le Ministre des Communications du Canada, decided in the Federal Court, Trial Decision on December 6, 1984, Justice P. Denault (unreported) (file no. T 1420-84). The action was dismissed on grounds unrelated to radio regulation. To avoid inconsistent departmental policy and to protect its jurisdiction over all forms of radio interference this jurisdictional lacuna should be filled when the Radio Act is next amended.

radio operator.⁵⁹ To the extent that the court responds to this ground of appeal, spectrum management law will be written.

On occasion, Canadian municipalities have created ordinances prohibiting or controlling radio interference.⁶⁰ There is only one known case where a local government attempted to enforce such a condition against a radio operator in Canada. The action was unsuccessful.⁶¹

- (ii) Location of antennae - as a general statement, the use of land for the site of an antenna for a radio device in Canada is subject primarily to the private controls brought to bear by the owner of the land, but the federal government, through the jurisdiction of the Radio Act and the Aeronautics Act, has the power to veto any particular site selection. The Minister of Communications may refuse a site related to technical radio matters (ie. s.5(c) of the Radio Act) and under the new aviation legislation, the Minister of Transport may regulate structures which are potential aeronautical obstructions (Aeronautics Act, s.3.9(1)(o)).
- (iii) Height of antennae - the Department of Communications, through the power delegated to the Minister of Communications, controls the

59 Factum Submitted on behalf of the Appellants John Ravenscroft and Helen May Ravenscroft, Court file no. 274/86 (at pp.6-12).

60 A current by-law in Kanata, Ontario contains a prohibition regarding radio interference. See: By-Law 29-82 (as amended) s.3(8)(h).

61 R v. Forbes, decided in the Ontario Provincial Court (Criminal Division) on June 8, 1981, Judge K.A. Langdon (unreported). The case involved an amateur (ham) radio operator who was accused of violating a City of Mississauga by-law which was designed to control interference in residential areas. The judge dismissed the case and stated that regulation of the emissions from radio stations was exclusively within the legislative competence of the federal government. (See esp. at p.4)

height of radio antennae and structures which support them, to the extent that such control is necessary for spectrum efficiency and interference management. In many cases, if coordination of the particular radio service with other services is not a problem, the height of the antenna is of no concern to DOC⁶². Likely, an attempt to regulate height on grounds unrelated to spectrum management or aviation would be ultra vires the federal government's powers as currently set out.

- (iv) Co-location of antennae - despite the fact that the Minister may grant or amend licences, "for such terms and subject to such conditions as he considers appropriate", the Department never orders current licensees to accommodate new applicants on their tower or at their site. On occasion, two or more new licensees have been given an authorization to construct on the condition that they accommodate each other at a common site. This has occurred very rarely and only when interference management or spectrum efficiency demands it.⁶³ Co-siting has never been ordered for aesthetic reasons.

62 For example, if a prospective licensee applied to DOC to site a 50 meter high antenna for a paging service in the middle of a residential zone, the issue of the suitability of a commercial antenna of that height in a residential area would not even be raised. The application forms currently in use do not enquire about the zoning or character of the prospective site. Currently, an amateur or GRS (CB) radio operator could erect a 50 meter antenna in their back yard and the Department would not be aware of it. Licences for these operators are personal in nature and provide no details at all about the antenna system to be used.

63 Some channels for broadcasting purposes have been allocated between Canada and the U.S.A. on the explicit understanding that when they are used their antennae will be co-sited. Certain FM broadcasting channels have been reserved for Canada's west coast on this understanding. The topography and the close proximity of major urban centres to each side of the border make this necessary in order to maximize use of the radio spectrum.

- (v) Safety regulations - there are three principal areas of regulation which involve the safety of antennae: (1) radio frequency emission control for human exposure; (2) aeronautical obstruction painting and marking; (3) structural and electrical regulation.

(1) RF emission exposure limits - in 1979, the Department of National Health and Welfare published Safety Code 6⁶⁴ which limits RF exposure in an occupational setting to a maximum amount averaged over one minute and one hour.⁶⁵ These exposure limits do not have the status of law, consequently they are merely guidance for the occupational environment. These standards are not intended to offer protection to those who are exposed to RF energy while in their homes. Currently, DOC is considering incorporating these standards into the broadcasting authorization process.⁶⁶

(2) Aeronautical obstruction regulation - for a number of years the authority to require the painting (orange and white bands) and lighting (red and/or white flashing lights) of communications towers was contained in two provisions within the General Radio

64 Recommended Safety Procedures for the Installation and Use of Radio frequency and Microwave Devices in the Frequency Range 10 MHz to 300 GHz.

65 The limits are $1\text{mW}/\text{cm}^2$ or 61 V/m averaged over one hour and $25\text{mW}/\text{cm}^2$ or 307 V/m averaged over one minute.

66 While DOC considers this policy, Health and Welfare Canada is reconsidering these standards and may issue much more stringent ones. See: A.G. Day, M. Durocher and B.M. Read, Canadian Broadcasters' Manual on Non-Ionizing Radiation, Canadian Association of Broadcasters, (Ottawa: 1986). (at p.9) This publication provides a good review of the state of domestic and international RF exposure regulation. The CBC has occupational code for its own employees and it is more stringent than the current Health and Welfare standards.

Regulations, Part II.⁶⁷ Prospective licensees were directed to send one part of their application form⁶⁸ to Transport Canada for a ruling. Under the new Aeronautics Act⁶⁹ and the regulations⁷⁰ passed thereunder, authority now clearly rests with Transport Canada for all aeronautical obstructions and DOC currently plans to rescind the parts of its regulations dealing with painting and lighting requirements⁷¹.

(3) structural and electrical regulation - since shortly after World War II, the Canadian Standards Association (CSA) has been

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- 67 The regulations were G.R.R., Part II, ss.12(1) and 117. While these regulations were relied on for many years to force applicants to submit the details of their antenna proposals to the transport ministry, their legal validity was very much in doubt. The problem is that there is no enabling provision in the Radio Act itself to support such regulation. Historically, s.7(e) was used to support these regulations, but its application to aeronautical safety is far from certain.
- 68 Form 16-879(1283), "Particulars of Proposed Site and Radio Antenna Structures".
- 69 Aeronautics Act, R.S.C. 1970 (as amended by S.C. 1985.) The enabling authority for aeronautical obstructions, section 3.9(1)(o), was proclaimed into force June 28, 1985.
- 70 Air Regulations, C.R.C. 1978 c.2, s.514.1(2) and (3). Subsection (2) permits the Minister of Transport to publish a Standards Obstruction Markings Manual and subsection (3) authorizes the Minister to order a structure painted or lit as prescribed by the Manual. The current manual is TP382E published March, 1987.
- 71 See: "Retention and amendment of certain sections of the General Radio Regulations, Part II, concerning antenna supporting structures and safety of radio equipment." Proposal 120 DOC-B87, within Federal Regulatory Plan - 1987, Minister of State (Privatization) and Minister Responsible for Regulatory Affairs, Government Publishing Centre, (Ottawa: 1987). (at p. 92)

creating and publishing structural and electrical standards for communication antennae supporting structures. These standards have no force of law when issued and are offered as a guide to industry action. For a number of years, the CSA standard S-37 (as updated over time), which applies to most (all but the smallest⁷²) support structures, has been incorporated into the authorization process for a TC & OC (broadcasting undertakings). DOC procedures have required that a "Structural Adequacy" form⁷³ be filed when a new support structure is to be constructed and when additional loading is to be added to an existing broadcasting antenna tower. The current form requires that the support structure meet the 1976 standard, CSA STD S-37-1976. No other antennae or support structures are regulated by the federal government for the integrity of their engineering. The general application form for licensed antennae does not enquire about structural adequacy⁷⁴ and unlicensed antennae have no authorization process with which to demand any details of the antenna system to be constructed.

There appear to be historical, technical and legal problems which have complicated DOC efforts to better and more comprehensively regulate the structural adequacy of antennae and their supporting structures. The first and foremost difficulty is that the current Radio Act does not supply clear enabling authority over technical issues which are not related to radiocommunication (ie. structural

72 The standard has no application for smaller attachment-type antennae nor those less than 25 meters above grade or 15 meters above the roof of a building. See: CSA STD S-37-M86, ss. 1.2(a),(b) and (c).

73 DOC Form 16-619(1-80) "Data Required Regarding the Structural Adequacy of Antenna Supporting Structures for Broadcasting Undertakings".

74 Form 16-879(1283), "Particulars of Proposed Site and Radio Antenna Structures".

safety, especially for non-broadcasting antennae).⁷⁵ The second problem is that the CSA does not have a current standard for smaller support tower applications.⁷⁶ The third complication involves the cost of modifying existing structures. When an applicant wishes to add another antenna to an existing broadcasting antenna support structure the question becomes; which technical standard must the structure meet? The CSA standards were made more stringent in 1965 (S37-1965), 1976 (S37-1976) and 1986 (S37-M86). Of the broadcasting antennae currently standing, a few antennae would not meet the 1965 standard, some would not pass the 1976 requirement and a great number would not meet the 1986 standard without very expensive modifications. If an 'upgrade' policy were rigorously applied, it would be the CBC and its affiliates which would have the greatest and most expensive compliance problem. The majority of those broadcasting towers pre-date current standards.

As a consequence of all of these problems, less than two percent of all licensed antennae (broadcasting structures only) are regulated by the federal government for structural adequacy and

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In the early 1980's, internally provided legal advice brought to an abrupt halt DOC efforts to amend the General Radio Regulations - Part II to extend structural adequacy and installation safety regulation to certain non-broadcasting licensed antennae. The advice, provided in February of 1983, stated that safety regulation of that nature was a very questionable extension of the Minister's mandate as set out in the Radio Act. Should the Department wish to regulate engineering safety of antenna support structures, its jurisdiction to do so should be clarified through an amendment to the Act.

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CSA C22.1-1978, "Safety Standards for Electrical Installations" provided engineering standards for structures which did not exceed 15 meters above the base of a building or 25 meters above grade. It used to be published as Appendix A in the Canadian Electrical Code - Part I, but it was deleted from the Code in 1981. The standard has not been revised or reissued by the CSA since 1978.

under current DOC policy and practice electrical safety and the structural standards are not consistently applied to those which are regulated.⁷⁷

As far as provincial structural regulation is concerned the Ontario Building Code, until it was quietly dropped from the current edition, required the 1976 CSA standard for all large antennae.

- (vii) Aesthetics - clearly, the discretion contained within the Radio Act regarding the authorization process, relate to the technical, as opposed to the aesthetic, impact of a proposal to erect an antenna or support structure. Accordingly, any requirements to: engineer the support structure, site an antenna in a particular manner, or require screening, with fences or natural vegetation, to achieve an aesthetic purpose, would be ultra vires the Act. Be that as it may, aesthetic regulation of domestic receiving antennae was attempted in Canada in the mid-1950's. Disguised as technical and safety controls, it lasted for about a decade.

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The policy appears to be inconsistent to the CSA's standard for three reasons. First, the 1976 standard is currently required by DOC despite the fact that an updated one, requiring more wind loading protection, has been published since September of 1986. Second, some towers are approved for a TC & OC despite the fact that, technically, under additional loading conditions they do not meet the 1976 standard. Third, when a non-broadcasting antenna (ie. microwave dish) is added to an existing broadcasting tower the current authorization process does not make issuance of a licence for the new antenna or service conditional upon meeting any CSA structural standards. Under current policy it is up to the broadcaster to obtain an engineer's certificate and submit a new "Structural Adequacy" form. Often, this is not done. It is also interesting to note that DOC once inspected broadcasting towers while they were under construction, but this practice stopped in the 1970's because of the manpower requirements necessary to do so.

Even prior to the introduction of television to Canada in September of 1952, there were thousands of externally-mounted TV receiving antennae in this country picking up signals from the U.S.A. As more channels became available on each side of the border more and more external antennae and supporting structures, often of a home-made variety, kept appearing. Many complained that they were very unsightly.⁷⁸ Municipalities started to complain to the federal regulator of the day, the Department of Transport. Some local governments tried to regulate TV antennae themselves with licensing standards and authorization fees.⁷⁹

In response, amendments to the Radio Act and to G.R.R. - Part II created and brought into force a great number of engineering standards which were designed to rationalize and standardize TV receiving antennae and their supporting structures and discourage do-it-yourself fabrications.⁸⁰ Municipal officials were appointed as inspectors under the new rules for those municipalities which chose to opt in to the scheme. Only about 18 chose to do so and

78 When the Hon. George Marler, then Minister of Transport, introduced amendments to the Radio Act, to permit regulation of the "mechanical features" of domestic TV and radio antennae, a Mr. Bryson voiced a common sentiment about their appearance.

"I think that it is really unfortunate that we have got these Buck Rodgers contraptions on the rooftop of every house.... When I go around the City of Ottawa and see these wierd and wonderful rotating stacked arrays, I am completely flabbergasted.... I can think of no more depressing sight than to visit new housing projects and see these antennae on the roofs of the houses." [House of Commons, Debates, March 17, 1955 (at p.2139)]

79 The City of Prince Albert debated creating a by-law which would levy a \$2.50 fee for each TV antennae erected within the municipality. Ibid, per Mr. Bryson.

80 Supra, footnote 52.

as cable service became more available, the number of external antennae diminished and the scheme was all but forgotten about.⁸¹

- (viii) Environmental Impact - in Canada today, no environmental legislation⁸² and no provision in the current Radio Act enables the Department of Communications to deny or modify an application for an antenna or support structure due to the environmental impact of the proposed action. At the federal level there exist some guidelines with respect to how federal activities may affect certain lands, called the Federal Policy on Land Use.⁸³ The guidelines apply to lands of historic, agricultural, recreational,

81 The Department is in the process of repealing these regulations and the schedules created pursuant thereto. Supra, footnote 71.

82 The history of federal environmental impact laws or Environmental Assessment and Review Policy (EARP), as it has become known, is relevant to this study. Despite the fact that it does not apply currently to the siting or operation of radio antennae, this, likely, will be changed in time. Pursuant to a directive issued by the Federal Cabinet in 1973, the first federal EARP policies and procedures were created. Their legal status, extent of application and mode of operation were very uncertain. In 1984, Order-in-Council, P.C. 1984-2132 approved a revised policy called the "Guidelines Respecting the Implementation of the Federal Policy on Environmental Assessment." This order-in-council confirmed the Federal Environmental Assessment and Review Office (FEARO) as the body responsible for environmental impact assessment on behalf of the federal Minister of the Environment. Under FEARO, environmental assessment policies and procedures have continued to develop. These rules, in their current form, cannot be used to assess the impact of radio antennae for two reasons. First, orders-in-council are subordinate to existing statutes, therefore this guidance could only apply to an existing environmental assessment process -- of which the Radio Act has none. Second, the legal status of the authority of this very order-in-council was recently challenged by the Joint Standing Committee of the Senate and the House on Regulatory Instruments.

83 These policy statements and guidelines were approved by the Federal Cabinet in December of 1980. See: Federal Policy on Land Use, Cat. No. En 72-9/1982, Minister of Supply and Services, (Ottawa: 1984). (pp. 10)

aesthetic or ecological importance and encourage federal departments and agencies to consider the impact of their own actions and of their authorization processes. The legal status of these policies is that they are merely guidelines and they could not, in of themselves, create a discretion to refuse an application for an antennae. This is unfortunate for municipalities as policy 5.10 specifically requires:⁸⁴

Local, regional and provincial concerns, plans and zoning will be considered, and appropriate action will be taken to ensure that the federal influence on land and local environments has a positive impact.

Despite a lack of clear enabling authority to take environmental impact into account when antennae are located and erected, one should not be left with the impression that such is never the case. First, in the past few years it has become increasingly more common for private citizen groups and municipal governments to attend C.R.T.C. hearings for broadcasting licences and object to the grant of the licence based upon the environmental impact of the transmitter and its tower(s). The objections have ranged from ecological concerns to the visual disruption (and even psychological disruption) caused by the tower(s) and flashing lights. For the most part, C.R.T.C. members have merely permitted these objections to be aired and put on the record.⁸⁵

84 Ibid. (at p.10)

85 No cases could be found where the C.R.T.C. included environmental factors as a condition for a broadcasting licence. This is not surprising considering the fact that applicants appear before the C.R.T.C. only after assurance has been given by the Department of Communications that a TC & OC has been, or will be, issued. The TC & OC is the authority to locate and construct the transmission facility at a specific site. The C.R.T.C. controls access to the Canadian broadcasting system. It does not issue construction permits.

Second, because the ownership of a great percentage of land in Canada is vested with public authorities - municipal, provincial and federal; governments and their agents have used control over the sale or lease of public lands as a method of taking environmental impact into account when radio antennae are to be sited upon them. For example, between 1975 and 1980, Parks Canada objected to an application by Northwestel to site a microwave relay station within the bounds of Wood Buffalo National Park in the Northwest Territories. This refusal was due to concern for the potential impact of the radio energy and tower guy lines on the whooping cranes, known to nest there.⁸⁶

In June of this year, the Ontario Municipal Board was used as a public forum to air and consider the objections of nine cottagers who protested the siting of a 380 meter TV transmission tower for Global Communications on provincial land.⁸⁷ The objectors, all of whom owned recreational property near to the proposed transmission site, argued that development of the land for this purpose would have an environmental impact on the natural habitat of the area and pose a risk to birds which may fly into the tower or its guy lines at night.

86 The impasse was broken when Northwestel agreed to install a microwave troposcatter system which would permit the radio signal to hop completely over the park. It is also interesting to note that, at this time, the park had a 50 ft. height limitation on all radio antennae sited within it. Land-Mobile antennae sited for the Canadian Wild Life Service respected that limitation.

87 See: In the Matter of Section 34 of the Planning Act, 1983 and In the Matter of Appeals by Frank Evans and Others, Against Zoning By-Law 87-2 of the Corporation of the Township of Georgian Bay, Memorandum of Oral Reasons of the Ontario Municipal Board delivered by D.S. Colbourne on June 18, 1987 (O.M.B. File R 870153). The O.M.B. chairman dismissed the concerns raised by the objectors and re-zoning was approved. Nevertheless permission to develop a portion of the site, which was inconsequential to the radio transmitter, was denied and environmental protection was undoubtedly the reason.

- (ix) Consonance with local planning - a very recent policy initiative by the C.R.T.C. - to require applicants for broadcasting licences to do their best to secure the assent of the local municipality for the siting of their transmitter and tower(s) - should be mentioned and analysed. In Decision CRTC 87-376⁸⁸, issued June 2, 1987, the C.R.T.C. granted a broadcasting licence to Westcom Radio Group for CFGM Richmond Hill to broadcast from a transmitter site to be located in the Town of Lincoln, Ontario (near Beamsville). The proposed AM broadcasting undertaking requires eight transmission towers, each 91 meters high, which will be sited on 80 acres of specialty farmland. In combination, the existing local and regional municipal land use laws do not permit the land to be developed in this manner.

In the decision referred to above, the C.R.T.C. approved the broadcasting licence, but made it conditional upon the applicant supplying proof that, "it has satisfied the zoning and land use requirements".⁸⁹ For all future cases, the Decision went on to state:⁹⁰

88 Reconsideration of Decision CRTC 86-990 approving an application by Westcom Radio Group Ltd. to amend the licence for CFGM, Richmond Hill, Ontario. By Decision CRTC 86-990 the Commission approved a broadcasting licence for CFGM to broadcast at a new frequency (640 kHz) and a new location, near Beamsville, Ontario. This action was preceded by a CRTC public hearing held in the National Capital Commission to which local residents and the local municipality of the proposed transmitter site were not given notice. Because those most affected by the placement of the transmission towers were not given an opportunity to make their views known, the Federal Cabinet by way of Order-in-Council P.C. 1986-2690 referred the initial decision back to the CRTC for a rehearing. Decision CRTC 87-376 is the reconsidered decision.

89 Ibid. at p.12.

90 Ibid.

"Moreover, the Commission expects that, as a matter of policy, applicants will have advised local authorities of their plans for siting of transmission towers and will have made every reasonable effort to meet local requirements. The Commission will expect these areas to be formerly addressed when applications are submitted."

It is submitted that the policy contained within Decision CRTC 87-376 does not provide sufficient protection for local interests- neither in the particular case nor for future broadcasting applications before the C.R.T.C. In this particular case, the Commission appears to have required Westcom Radio Group to obtain local approval before it can broadcast from the site. When this condition is read in the context of the entire decision, in reality, the broadcaster's obligations are; to do what is feasible within twelve months of the decision to meet the reasonable requirements of the municipality. What makes such a condition unworkable is that the Council and citizens of the Town of Lincoln have at all times, insisted that these towers must go elsewhere and that no accommodation by the broadcaster would make the proposal acceptable.⁹¹ The reason that this policy may be of little assistance in the future is because there appears to be no

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This view was emphatically repeated by the mayor of Lincoln when the reconsidered decision was announced. See: "CRTC backs radio towers for 2nd time," The Toronto Globe and Mail, June 4, 1987 (at p.A9).

enabling authority in the C.R.T.C. Act⁹² or Broadcasting Act⁹³ to support it.

As the material previously discussed demonstrates, there are many aspects of the health, safety and aesthetics of radio antennae and their support structures which the federal government does not regulate. Many of the aspects, not subject to federal control, are of immediate concern to Canadian municipalities. Constitutional Law must be examined to see how municipalities may be legally permitted to regulate on the absence of, or concurrently to, federal powers and policies in this area.

92 According to section 14 of the Canadian Radio-television and Telecommunications Commission Act, S.C. 1974-75-76, c.49, the "objects and powers of the Commission and the Executive Committee in relation to broadcasting are as set forth in the Broadcasting Act".

93 The Broadcasting Act, R.S.C. 1970 c.B-11 (as amended), sets out the powers of the Commission in section 15. It states, "Subject to this Act ... the Commission shall regulate and supervise all aspects of the Canadian broadcasting system with a view to implementing broadcasting policy enunciated in Section 3 of the Act." While section 3 of the Broadcasting Act is very broad, and legal cases have tended to give the section liberal interpretation, it is submitted that local land use issues are so outside of the cultural, political, social and economic issues related to maintaining the Canadian broadcasting system, they are ultra vires the Act itself.

III. AN ANALYSIS OF CONSTITUTIONAL JURISDICTION IN RELATION TO RADIOCOMMUNICATION

Introduction

The critical function served by the public communications industry upon the development and maintenance of the Canadian federation has been acknowledged by numerous commentators.⁹⁴ As observed by Martha and Roderick Fletcher⁹⁵

"the mass media are generally recognized as playing a long-term role in the communication of social and political norms in a society and in the promotion of awareness of political leaders, domestic political issues, and a sense of shared identity or common political future."

The commercial side of communications has played an equally important role to foster the economic and social advancement of our nation. In view of the influence exerted by communications enterprises upon the political, cultural and economic future of Canada⁹⁶ it is not surprising that issues related to regulatory competence have generated intense legal and political controversy involving questions of control over both technological advances and content.

94 See, for example, C.H. McNairn, "Transportation, Communication and the scope of Federal Jurisdiction", (1969) 47 Can. B. Rev. 355; C.M Dalfen and L.J. Dunbar, "Transportation and Communications: The Constitution and the Canadian Economic Union" in M. Krasnick (ed.), Case Studies in the Division of Powers, (Toronto: 1986), M. and F. Fletcher, "Communications and Confederation" in R. Byers (ed.), Canada Challenged: The Viability of Confederation, (Toronto: 1979).

95 Fletcher, ibid, at p.159.

96 See, for example, Canada, Department of Communications, Telecommission Study 2(d): Communications and Regional Development (Ottawa: 1971) (at pp.16-25).

The resolution of these jurisdictional disputes has had and will continue to have a profound impact upon the preservation of Canadian culture and social and economic growth.

The purpose of this section of the study is to examine the current constitutional structure respecting regulation of communications as such relates to radiocommunications. An analysis will be provided of the actual and potential extent of federal, provincial and municipal authority permitted by existing constitutional arrangements. In this respect, an effort will be made to identify the competing interests of federal, provincial and municipal governments in regulation of radiocommunications and to ascertain the degree to which such interests are either realized or frustrated by recent trends in constitutional interpretation. Finally, discussion will focus upon legal techniques which would enable a more flexible accommodation of national, regional and local objectives.

The Nature of the Interests Involved

Central to any analysis of constitutional competence related to radiocommunications is an identification of national and regional interests pertaining thereto. Considerations arguing in favour of centralized authority reposed in the federal government are numerous. The very behaviour of radio energy in the environment would appear to require the intervention of the federal government to control at the very least the physical aspects of transmitting and receiving, including access to and assignment of radio frequency; antenna type, location, height, and engineering and structural specifications; and the technical standards for radio apparatus in order to ensure the integrity of inter-regional communications and the central co-ordination of research and development. Further, federal claims to authority over the technical facets of radiocommunications are reinforced by its interrelationship with other subject

matters of national importance such as the transportation industry⁹⁷, and defence. Finally, the need for centralized competence is demanded by the existence of international conventions, ratified by Canada, concerning the allocation and registration of radio frequencies and prevention of interference.

However, the federal interests in regulation of radiocommunications are not confined to technical activities associated with management of a limited global resource. A consistent premise of federal intervention has been derived from the desire to maintain the integrity of the federal state through the development of a broadcasting system which will "safeguard, enrich and strengthen the cultural, political, social and economic fabric of Canada."⁹⁸ As one commentator has noted, "the Canadian government ... wants to protect the financial position of the Canadian broadcasting industry so as to achieve the larger goal of using the media as a tool for acculturation and promotion of national unity."⁹⁹ The 'nationalizing' impact of radiocommunications has both cultural and economic implications. The control of Canadian and foreign programming content and the transfer of ownership of undertakings¹⁰⁰ as well as the regulation, through licensing, of market entry, signal carriage priority and carriage of foreign signals are examples of such implications. And, in this respect, "since control over the medium influences both access to audiences for Canadian programmes and the resources available to produce them"

97 Analogous provisions are found in section 92(10) of the Constitution Act, 1867.

98 An Act Respecting Telecommunications in Canada, Bill C-24, s.3.

99 K. Swinton, "Advertising and Canadian Cable Television - A Problem in International Telecommunications Law" (1977), 15 Osgoode Hall L.J. 543 (at p.563).

100 See: Fletcher, supra, footnote 94 at pp.166-169.

it is evident that federal claims to technological and substantive authority in relation to radiocommunications are inextricably linked.¹⁰¹

Localized interests - both provincial and municipal - are equally obvious and to a large degree mirror rather than oppose federal objectives. Just as federal insistence on hegemony in the cultural dimension of radiocommunication has emphasized concern for national unity and national identity¹⁰², provincial claims to jurisdiction over programming content rely upon regional distinctiveness, rejecting either implicitly or explicitly the notion "that culture is primarily a federal responsibility or that national unity requires the development of a single dominant culture."¹⁰³ The possibility of provincial control over radiocommunication also bears upon regional economic and social welfare since the location and availability of radiocommunication facilities are critical to coherent regional development plans.¹⁰⁴ Such concerns are particularly acute at the municipal level. While the effect of the current

101 Fletcher, supra, footnote 94 at p.174.

102 See the statements of the Supreme Court of Canada in Capital Cities Communications v. CRTC, (1978), 81 D.L.R. (3d) 623.

103 See the Report of the Boyle Committee at 55 and 61: "... Unity is not uniformity ... the mandate of unity can only be fulfilled by giving Canadians a sense of their identity, regional as well as national, and in their varying kinds of history, ethnic make-up, and cultural traditions, and by trying to get rid of the stereotypes that are produced from ignorance." quoted in Fletcher, supra, footnote 94 at p.180. See as well, the Report of the Pepin-Robarts Task Force on Canadian Unity, 1979 which recommended that "Quebec should be assured the full powers needed for the preservation and expansion of its distinctive heritage." (at pp.85-86); The Canadian Bar Association, Towards a New Canada (1978); The Quebec Liberal party, "A New Canadian Federation" (1980).

104 D. Elton, F. Engelmann and P. McCormick, "Alternatives: Towards the Development of an Effective Federal System for Canada", a 1978 paper prepared for the Canada West foundation; E.R. Black "What Alternatives Do We Have if Any?" Simeon (ed.), Must Canada Fail?

constitutional framework is to impose upon the provinces primary responsibility for the economy, municipalities by delegation exercise extensive regulatory authority over local matters affecting the community's health, safety, morals, aesthetics and property values. To the degree that the presence of radiocommunication facilities, both amateur and commercial, may impinge upon legitimate municipal concerns relating to the health and safety of citizens, land-use and environmental impact, provincial and municipal claims appear equivalent to if not co-extensive with those advanced by federal authorities.

In short, the field of radiocommunications is one in which the desire for both territorial pluralism (regionalism) and the promotion of a national identity, combined with the need for uniform management of the spectrum resource, justify the recognition of a regulatory regime in which jurisdiction is, to some extent, shared between central and local governments. Such a regime would strike an appropriate balance between "the accepted need for a strong national system and the particular needs of localities" and would reflect "legitimate provincial objectives in culture and education as well as in economic and social development."¹⁰⁵ A regulatory structure accommodating both centralizing and decentralizing features would additionally exhibit receptivity and sensitivity to distinctive municipal objectives without significantly impairing "the federal government's capacity to ensure inter-regional communication and promote a national sense of community."¹⁰⁶

While, however, the cultural, political and economic importance of radiocommunications both at the national and regional levels favours, in a pragmatic sense, the intervention of both federal and provincial governments, any regulatory mechanism adopted must be one which is compatible with the present constitutional division of powers. Therefore, it is necessary to examine the ways in which the constitution contributes to or undermines federal/provincial co-operation and co-ordination in the development of

105 Fletcher, supra, footnote 94 at p.173.

106 Ibid.

national policies respecting the technological aspects of radiocommunications. Thus, this study will focus next upon judicial interpretation of those provisions of the Constitution of Canada which either directly or by analogy establish legislative competence in relation to radiocommunications.

The Present Constitutional Framework

Canada, as a federal state, is characterized by a political structure in which legislative and executive powers are divided between the federal Parliament and the provincial legislatures. This distribution of legislative and executive authority is achieved by the terms of the Constitution Act, 1982 (as originally enacted, the Constitution Act, 1867), the effect of which is to impose jurisdictional limitations upon the federal and provincial legislatures, through section 91 which defines the scope of federal regulatory authority and section 92 describing that assigned to the provinces. In general terms, section 91 empowers the federal government to "make laws for the peace, order and good government of Canada in relation to all matters not coming within the classes of subjects assigned exclusively to the Legislatures of the Provinces." Section 91 further empowers Parliament to enact laws in relation to specific enumerated areas such as the criminal law, trade and commerce and taxation. Section 91 therefore assigns to the national legislature two grants of legislative authority: that in relation to the specified classes of subjects (the enumerations) and that in relation to the 'peace, order and good government of Canada' (the residuum). Section 92 allows the provincial legislatures to "make laws in relation to matters coming within the classes of subjects next hereinafter enumerated" including property and civil rights, local works and undertakings and local and private matters. The principle of distribution underlying section 91 and 92 is the distinction between matters which are of national significance and thus within federal jurisdiction and those which are of localized importance and thus within provincial competence. Through this constitutional division of powers, a delicate balance is achieved between the interests of uniformity and centralization on the one hand and diversity and decentralization on the other.

Under our constitutional system the courts or the judiciary bear ultimate responsibility for the interpretation of provisions of the constitution and, therefore, for the determination of the validity of both legislative and executive action. The process of judicial review is dictated by the express language in which the power-conferring provisions of the Constitution Act are expressed. Since each grant of legislative authority is characterized as 'exclusive', action by either level of government which exceeds the constitutional boundaries created by sections 91 and 92 is characterized as ultra vires (beyond the legitimate scope of the enacting body). A law which is found to be ultra vires is invalid on jurisdictional grounds since "a statute emanating from a legislature not having power to pass it is not law."¹⁰⁷ When reviewing for constitutional validity it is therefore "the duty of the courts ... to ascertain in what degree and to what extent authority to deal with matters falling within these classes of subjects exists in each legislature and to define in the particular case before them the limits of their respective powers."¹⁰⁸

A finding of ultra vires is reached by a process of judicial classification which consists of three stages. Initially, courts, when confronted with challenged legislation must isolate the 'matter' of the enactment. 'Matter' is equivalent to 'the primary matter dealt with', the 'pith and substance', the 'true nature and character' and the 'subject matter and legislative character.' The 'matter' may be discovered by reference to extrinsic aids such as regulatory impact statements, history, and precedent.

Secondly, courts must define the ambit of the classes of subjects enumerated in sections 91 and 92 by a process which has been described as 'mutual modification' according to which "the two sections must be read together and the language of one interpreted, and where necessary, modified by

107 Bank of Toronto v. Lambe (1887), 12 A.C. 575, (at p.587).

108 Citizens Insurance Co. v. Parsons (1881), A.C. 96, (at p.110).

that of the other."¹⁰⁹ The principle of 'mutual modification' is designed to reconcile the competing claims of federal and provincial legislative authority which are an inevitable result of the general and abstract language employed in the Constitution Act, 1867. A glance at the classes of subjects contained in sections 91 and 92 reveals that many of the enumerations overlap. For example, the federal power in relation to 'trade and commerce' (section 91(2)) would appear to encompass provincial legislative power in relation to 'property and civil rights in the province' (section 92(13)). However, through mutual modification it is possible to achieve an accommodation of federal and provincial interests which would permit the maximum degree of the exercise of legislative competence consonant with the constitutional structure.

The third and final step in the process of judicial review for constitutional validity is the assignment of the legislation to that 'class of subject' (contained in either section 91 or 92) to which it exhibits the strongest affinities, or conceptual relationship. Legislative competence in relation to subjects such as, for example, aeronautics, which do not appear to be connected with any enumeration will be determined by reference to its scope or dimension. If the subject matter of the legislation possesses a 'national dimension', jurisdictional competence falls to the federal residuary power. If, conversely, the legislation under examination evidences no national concern but is of merely localized significance, then constitutional competence will be assigned to the provinces. Judicial review for constitutional validity therefore requires the court "to construe the challenged statute itself carefully to be sure of having determined its full meaning, that is, the full range of features by any of which or by any combination of which it may be classified" and then to "assess the relative importance of the respective federal and provincial features of the statute."¹¹⁰

109 Ibid.

110 W.R. Lederman, "Classification on Laws and the British North America Act" in Continuing Canadian Constitutional Dilemmas (Toronto: 1981) (at p.241).

It should be observed, however, that this classificatory procedure is deceptively simple. Few, if any, enactments relate to merely one head of power in either the federal or provincial list. Instead most legislation can be justified constitutionally on a variety of bases. Moreover, while the jurisdiction of both federal and provincial authorities is described in the Constitution Act as 'exclusive', it is clear that the laws enacted by one level of government will almost invariably exert an impact upon the legislative jurisdiction of the other. For example, a provincial law imposing a tax upon banks clearly impinges upon a subject matter (banks) within the exclusive jurisdiction of the federal Parliament while at the same time involving an express head of provincial jurisdiction (taxation). Similarly, provisions contained within the federal Divorce Act concerning maintenance and custody of children would appear to intrude upon a realm of provincial legislative competence (property and civil rights in the province).

The possibility that laws enacted by one level of government will affect the exercise of legislative power by the other is an inevitable result of the classification procedure. Since laws are constitutionally characterized by their primary matter, incidental impact upon a field of competence assigned to the competing level of government becomes constitutionally irrelevant. If the interference may be described as ancillary or necessarily incidental to the effective operation of an enactment, the law will be upheld as valid. This 'ancillary' doctrine is designed to resolve the principal problem in constitutional review: whether a matter is fairly included within the class of subject to which it is sought to be assigned. Successive cases have determined that if there is 'a rational, functional connection' or sufficiently strong nexus between those portions of an enactment which are clearly valid and those which, viewed in isolation, would intrude upon the authority of the competing level of government, the latter will be validated as 'necessarily incidental' to the efficient exercise of the principal power. For example, while it is clear that provincial legislatures may regulate child custody, the 'ancillary' or 'necessarily incidental' doctrine has been employed to permit Parliament to enact laws in relation to child custody in the context of divorce on the basis that such jurisdiction is necessarily incidental to the effective exercise of the federal divorce power.

The 'ancillary' doctrine merely reflects practical reality - namely, the recognition that both federal and provincial legislatures, acting pursuant to independent and exclusive legislative powers may enact laws in relation to the same subject matter. The 'ancillary' doctrine acknowledges the existence of a common domain with gates of entry for both Dominion and Province. Such a common domain is otherwise described as a field of concurrent legislative authority. Concurrence permits joint legislative competence in respect of certain subject matters. The pre-condition for the concurrent operation of federal and provincial laws is the independent validity of the overlapping laws. As explained by the Privy council in A.G. for B.C. v. A.G. for Canada, [1930] A.C.111:

"First, there can be a domain in which provincial and dominion may overlap in which case neither legislation will be ultra vires if the field is clear." (at p.118)

The catalogue of concurrent fields which has been recognized by Canadian courts includes such diverse matters as insolvency, highway traffic, securities transactions and retail sales.

The existence of common or shared fields of legislative competence raises the further possibility of conflict between federal and provincial enactments. The question then arises as to which enactment is to prevail. The answer to this inquiry has traditionally been as follows:

"if the field is not clear and the two legislations meet the Dominion Legislation must prevail." (A.G. for B.C. v. A.G. for Canada, [1930] A.C. 111 (at p.118))

The suspension of provincial by federal legislation is described as the principle of paramountcy. Application of the principle of paramountcy cannot occur unless federal and provincial laws co-existing in respect of the same matter are, considered singly, independently valid. If either enactment is ultra vires there need be no further consideration as to whether paramountcy ought to apply. However, if both federal and provincial laws are jurisdictionally valid, paramountcy will be invoked to resolve conflicts

between the terms of the two laws. Conflict in this sense denotes repugnancy or operational incompatibility in the sense that compliance with one law involves breach of the other. According to the recent decision of the Supreme Court of Canada in Multiple Access v. McCutcheon, [1982] 2 S.C.R. 161:

"In principle, there would seem to be no good reason to speak of paramountcy and preclusion except where there is actual conflict in operation as where one enactment says "yes" and the other says "no"; the same citizens are being told to do inconsistent things; compliance with one is defiance of the other." (at p.191)

Since paramountcy will only apply in the event of an express contradiction between the federal and provincial laws, federal and provincial laws may supplement and even duplicate one another without any violation of basic constitutional principles.

Judicial interpretation of the power conferring provisions of the Constitution Act (sections 91 and 92) has therefore resulted in a relatively high degree of flexibility which allows maximum scope to both federal and provincial legislatures. While legislative jurisdiction is defined as 'exclusive', judicial construction of sections 91 and 92 (by emphasizing the importance of 'matter') has permitted one jurisdiction to exert a substantial impact upon the other as long as this intrusion represents only an ancillary or incidental effect of the law in question. Thus, constitutional validity is to be determined by 'primary' and not 'secondary' effects. This principle may be otherwise described as that of concurrency. In the event of conflict between federal and provincial laws affecting essentially the same subject matter, federal laws will prevail.

While these propositions are accurate depictions of general trends in Canadian Constitutional law, they are, to a certain extent, qualified by the existence of immunities enjoyed by certain instrumentalities such as federally-incorporated companies and federal works and undertakings. The existence of an immunity simply denotes the recognition of a privileged exemption from the operation of otherwise valid laws of general application. Cases tend to support the view that the extent to which federal instrumentalities are bound

by valid provincial laws is governed by three general propositions. Such entities are subject to provincial laws of general application unless:

- (a) the statute relates, in pith and substance, to a matter outside the province's legislative jurisdiction (the principle of ultra vires);
- (b) the statute incidentally affects a legislative subject matter within federal jurisdiction and Parliament has enacted legislation in conflict with the provincial act (the principle of paramountcy);
- (c) the effect of applying the statute to the federal instrumentality would be to impair its status or essential capabilities.

According to the doctrine of interjurisdictional immunity, undertakings which are within exclusive federal jurisdiction (such as interprovincial transportation operations) are exempt from otherwise valid provincial laws which would 'sterilize' or 'mutilate' essential aspects of the undertaking. Thus federal undertakings of this nature may be immune from provincial laws controlling routes, rates, labour relations, zoning and other municipal by-laws on the basis that such laws affect a vital part of the management and operation of the undertaking. The doctrine of interjurisdictional immunity is inconsistent with other, traditional principles of constitutional law which indicate that no enactment is to be invalidated simply on the basis of incidental, secondary impact. The constitutional validity of a statute is judged instead by reference to its dominant character. The exemption of federal undertakings from otherwise valid provincial laws must therefore be regarded as a constitutional anomaly - the scope of which is relatively uncertain.

Jurisdiction Over Radiocommunications

(a) Federal Jurisdiction

Neither communications as a generic subject matter nor radiocommunications as a subclass of communications is mentioned explicitly in the Constitution Act, 1867. The failure to expressly assign jurisdiction in relation to electronic communications is explicable in terms of the state

of technology in 1867. As a result, the determination of responsibility for the various media must be judicially inferred from analogous provisions in the original confederating statute and through the application of general principles of constitutional interpretation. Interpretation depends, in part, upon the mode of communications involved, and consequently, the scope of federal authority (and the rationale offered in justification) varies by mode. Since this paper is concerned solely with constitutional jurisdiction in relation to radio communications, only parenthetical discussion will be addressed to the issue of responsibility for telecommunications.

Although the Constitution Act, 1867 omits any allusion to communications as a global category of legislative competence, it does refer explicitly to responsibility for telegraphs, as the primary mode of communications (other than the postal service) known in 1867. The ultimate assignment of constitutional authority in relation to telegraph reflected the importance attached to the medium prior to 1867. Telegraphs, as the earliest form of telecommunications, had been the subject of pre-confederation legislation in both Upper and Lower Canada as well as of an international convention concluded in 1864 which extended to the British North American colonies. When the matter arose immediately prior to confederation, the significance of communications in the maintenance and expansion of the new state was immediately acknowledged as a factor supporting federal jurisdiction. Lord Carnarvon observed in 1867:

"Public works fall into two classes: first, those which are purely local, such as roads and bridges and municipal buildings- and these belong, not only as a matter of right, but also as a matter of duty, to the local authorities. Secondly, there are public works which, though possibly situated in a single Province, such as telegraphs, canals and railways, are yet of common import and value to the entire confederation, and over these it is clearly right that the Central Government should exercise a controlling authority."

The allocation of responsibility for telegraphs reflected the 'national' dimension inherent in communications while at the same time preserving some scope for the expression of purely regional concerns. Section

92(10) of the Constitution Act, 1867 confers on each province the exclusive power to make laws in relation to "local works and undertakings" subject to expressly designated exceptions which are reserved from provincial jurisdiction and assigned to Parliament. Section 92(10) provides that the Legislature of each Province may exclusively make laws in relation to:

- "10. Local works and undertakings other than such are of the following classes:
 - (a) Lines of steam or other ships, railways, canals, telegraphs, and other works are undertakings connecting the Province with any other or others of the Province, or extending beyond the limits of the Province;
 - (b) Lines of steam ships between the Province and any British or Foreign country;
 - (c) Such works as, although wholly situate within the Province, are before or after their execution declared by the Parliament of Canada to be for the general advantage of Canada or for the advantage of two or more of the Provinces."

Paragraphs 92(10)(a) and (b) function by assigning federal jurisdiction not according to the particular mode of transportation or communication but by reference to the extent to which transport or communicative undertakings exhibit an interprovincial or international character or, conversely, are localized in scope. Section 92 confers jurisdiction upon both 'works' and 'undertakings'. 'Works' have been described as physical things which enjoy a distinct physical existence. An 'undertaking', in contrast, is "not a physical thing, but is an arrangement under which ... physical things are used." (Re Regulation and Control of Radio Communications, [1932] A.C. 304). While the structure of section 92(10) might suggest that federal authority applies only to the interprovincial or international aspects of the work or undertaking, judicial interpretation has consistently indicated that once a sufficient interprovincial feature is demonstrated, then the entire work or undertaking is subject to federal control. (See A.G. Ont. v. Winner, [1954] A.C. 54]. Of the two exceptions from the grant of provincial authority contained in

sections 92(10)(a) and (b), section 92(10)(a) is clearly the more relevant to the question of jurisdiction over communications.

Subsequent decisions concerning the operation of section 92(10)(a) in relation to telecommunications have established the extensive federal jurisdiction thereby created. First, it was held as early as 1905 in Toronto Corporation v. Bell Telephone Co. (A.C. 52) that federal authority encompasses not only the interprovincial or international aspects of the communication enterprise but takes in, as well, purely local services which are functionally integrated with the interprovincial or international elements. The case involved the extent to which Bell Telephone, a federally incorporated company, was required to obtain the consent of the municipality of Toronto to establish lines on city streets. In rejecting the argument of the municipality that the local and long distance functions of Bell constituted two distinct and separate businesses the Privy Council observed:

[T]he facts do not support the contention of the appellants. The undertaking authorized by the Act of 1880 was one single undertaking, though for certain purposes its business may be regarded as falling under different branches or heads. The undertaking of the Bell Telephone Company was no more a collection of separate businesses than the undertaking of a telegraph company which has a long-distance line combined with local business, or the undertaking of a railway company which may have a large suburban traffic and miles of a railway communicating with distant places." (at p.59)

Toronto Corporation v. Bell Telephone Co. and its progeny thus clearly establish that the criterion of federal jurisdiction under s. 92(10)(a) is that of the character of the service involved. As a result if the operations of an otherwise purely local undertaking are so integral to the operations of an interprovincial undertaking (either because of a physical or functional connection), the undertaking will be constitutionally viewed as a single and indivisible entity subject to federal jurisdiction.

Secondly, again as established in Toronto Corporation v. Bell Telephone Co., once an undertaking has been characterized as interprovincial or international and thus, subject to federal jurisdiction, it enjoys a certain degree of immunity from the operation of provincial laws. With respect to the necessity of municipal consent, the Privy Council remarked:

"...It can hardly be disputed that a telephone company the objects of which as defined by its Act of incorporation contemplate extension beyond the limits of one province is just as much within the express exception as a telegraph company with like powers of extension. It would seem to follow that the Bell Telephone Company acquired from the Legislature of Canada all that was necessary to enable it to carry on its business in every province of the Dominion, and that no provincial legislature was or is competent to interfere with its operation, as authorized by the Parliament of Canada." (at p.57)

While the Bell Telephone case clearly sustained federal jurisdiction in relation to telephones as a species of communications analogous to the telegraph, it did not in itself purport to extend this rationale to other emerging forms of communications such as radio communications. The question of regulatory competence in relation to radio and, by extension, television was, however, decided by the courts at a fairly early stage. In 1931 the issue was referred to the Supreme Court of Canada by Parliament in the form of two questions. First, "Has the Parliament of Canada jurisdiction to regulate and control radio communication, including the transmission and reception of signs, signals, pictures and sources of all kinds by means of Hertzian waves, and including the right to determine the character, use and location of apparatus employed?" Secondly, "If not, in what particular or particulars or to what extent is the jurisdiction limited?" By a bare majority of three to two, the Supreme Court sustained exclusive federal jurisdiction. Those members of the court ruling in favour of Parliamentary authority relied on several bases of justification. First, according to Anglin, C.J.C., radio communications resembled telegraphs and as undertaking connecting one province with another, constituted an interprovincial undertaking within the meaning of section 92(10)(a). Although this rationale was endorsed

by the other two members of the majority (Newcombe, J. and Smith, J.), an alternative basis for the assertion of federal jurisdiction was proposed by Newcombe, J. According to Newcombe, J.

"But while the Dominion has at least the authority to regulate and control radio activities, and to provide against confusion or interference, as affecting its own enumerated subjects, and for the performance of treaty obligations, it also has the comprehensive power involved in the declaration of its authority in relation to all matters not coming within the classes of subjects by the B.N.A. Act assigned exclusively to the Legislatures of the Provinces; ... "radio communication" ... is not, substantially or otherwise, a local or private matter in a Province ... The subject is one which undoubtedly relates to the peace, order and good government of Canada." (Re Regulation and Control of Radio Communication, [1931] 4 D.L.R. 865. (at pp.871-872))

Assignment to exclusive federal jurisdiction was viewed as supportable on pragmatic grounds related to the technology of the day. As observed by Newcombe, J. (at p.869):

"... I must proceed on the assumption that radiocommunication in Canada is particularly Dominion wide; that the broadcasting of a message in a Province, or in a territory of Canada, has its effect in making the message receivable as such and is also effective by way of interference, not only with the local political area within which the transmission originates, but beyond, for distances exceeding the limits of a Province, and that, consequently, if there is to be harmony or reasonable measure of utility or success in the service, it is desirable, if not essential, that the operations should be subject to prudent regulation and control."

Additional factors favouring federal rather than provincial authority were discovered in specific federal enumerations such as sections 91(5) (Postal Service), 91(7) (Militia, Military and Naval Service, 91(9) (Beacons, Buoys, Lighthouses and Sable Island) and 91(10) (Navigation and Shipping), to which control over radio communications was regarded as necessarily incidental. Finally, the majority adopted the view that section 132 which provided that:

"The Parliament and Government of Canada shall have all Powers necessary or proper for performing the Obligations of Canada or of any Province thereof, as Part of the British Empire, towards Foreign Countries, arising under Treaties between the Empire and such Foreign Countries"

was sufficient to empower the federal government to implement the provisions of the 1927 International Radiotelegraph Convention.

The majority was not prepared to concede that radio communication as an undertaking could be divided into interprovincial and local components. In response to the argument that a distinction could be drawn between transmission and reception, the latter being a purely local and private matter, Newcombe J. stated (at p.873):

"In the course of discussion an attempt was made to distinguish between the transmission of a message and the reception of it; and it was said that the receiving instrument is property in a Province, and that a message is received in a Province when the instrument, being there, is adapted and worked for that purpose. But the question is directed, not to rights of property in goods or chattels situate in a Province, but to 'radio communication' - an effect which is not local, but interprovincial. There must be two parties to a communication; there may be many more; and, if the sender be in a foreign country, or in a Province or territory of Canada, and the receiver be within another Province, it is impossible, as I see it, to declare that the communication, is local, either to the transmitting or to the receiving Province."

In contrast, Rinfret J. and Lamont, J. were prepared to recognize radio communications as a concurrent field. While both conceded that certain aspects of radio communications would fall within federal jurisdiction, according to, Rinfret J. (at 875 ff.):

"By themselves, the transmitting and receiving instruments are objects of property of a local nature situate in a Province within the meaning of s. 92.... I do not hold, therefore, with the claim that simply because a civil right or local work produces effects beyond a Province it acquires ipso facto a character which has the effect of withdrawing it from provincial jurisdiction ... From a legal point of view, it is difficult to see the distinction between radio

communication ... and the transmission of sounds in any other way from one Province to another. And it is also fitting, on this account, to compare the receiving instrument to a simple amplification of the human ear, since its function is nothing more than to render perceptible to the ear sounds or signals diffused through the ether by the propagation of intangible waves. In these circumstances, the primary jurisdiction rests, therefore, with the Provinces, and this jurisdiction cannot be encroached upon unless there can be found in s. 91 subjects of federal jurisdiction which would give, within the limits of their particular application, the power to invade the field of this primary provincial jurisdiction."

An appeal to the Privy Council ([1932] 2 D.L.R. 81) resulted in an affirmation of exclusive federal jurisdiction. Two justifications were advanced. First, the Radiotelegraph Convention, while not a treaty strictu sensu within the meaning of section 132 of the Constitution Act, 1867, imposed international obligations which could only be effectively implemented by federal legislation. According to Viscount Dunedin:

"It is Canada as a whole which is amenable to the other powers for the proper carrying out of the Convention; and to prevent individuals in Canada infringing the stipulations of the Convention it is necessary that the Dominion should pass legislation which should apply to all the dwellers in Canada. Being therefore not mentioned explicitly in either s. 91 or s. 92 such legislation falls within the general words at the opening of s. 91 which assign to the Government of the Dominion the power to make laws "for the Peace, Order and good Government of Canada". (at p.84).

Secondly, the Privy Council indicated a willingness to adopt an expansive definition of 'telegraph' to include radio communication and rejected the contention that a distinction existed between transmission and reception. In an attempt to retain some scope for the exercise of provincial authority, it had been argued that even if transmitters were of necessity subject to federal jurisdiction (in order to avoid interference), that it was not axiomatic that radio receivers which did not emit interprovincial signals (and hence could not cause interference) were similarly within federal jurisdiction. Rather, receivers could legitimately be regarded as either species of 'property and civil rights' within the province or as local and private matters. The Privy Council refused to entertain the

possibility of a divided jurisdiction. In the view of the Council, radio communications operated as an unseverable undertaking extending beyond the limits of a single province and thus came within the scope of section 92(10)(a). As observed by Viscount Dunedin:

"Once it is conceded, as it must be, keeping in view the duties under the Convention, that the transmitting instrument must be so to speak under the control of the Dominion, it follows in their Lordships' opinion that the receiving instrument must share its fate. Broadcasting as a system cannot exist without both a transmitter and a receiver. The receiver is indeed useless without a transmitter and can be reduced to a nonentity if the transmitter closes. The system cannot be divided into two parts, each independent of the other.... 'Undertaking' is not a physical thing but is an arrangement under which ... physical things are used. Their Lordships have therefore no doubt that the undertaking of broadcasting is an undertaking 'connecting the Province with other Provinces and extending beyond the limits of the Province'; But further ... they think broadcasting falls within the description of 'telegraphs'. A divided control between transmitter and receiver could only lead to confusion and inefficiency." (at p.83).

The perceived integrity of the system coupled with the inability to confine radio signals within the geographic boundaries of a single province compelled the Privy Council to conclude that jurisdiction over radio communication was reposed solely in the federal level of government. The language employed by the Privy Council in favour of federal authority over the technical aspects of radio communication was so expansive that federal regulatory competence in this area has remained unchallenged until recently, it apparently being a tacit assumption that the assignment of frequencies, the specification of structural and engineering standards and location of equipment were exclusively subject to the control of Parliament.

Subsequent cases have not repudiated nor restricted the reasoning of the Radio Reference but have, rather, employed its rationale to support the assertion of federal jurisdiction over more recently developed modes of communication, such as television, which utilize radio communication technology. The expansion of federal authority, which has been supported

on the alternative basis of the peace, order and good government power and federal competence over interprovincial undertakings, has been addressed to two distinct matters: first, the issue of jurisdiction over cable television undertakings; secondly, the issue of jurisdiction in relation to programme content.

As to the former matter, it is now clearly established that cable television systems which receive television and radio signals "off air" and redistribute them to subscribers via coaxial cable networks constitute integral components of radio reception facilities and thus are indivisible from the interprovincial element of radio communications undertaking. This analysis of the operation of cable television formed the basis for the decision of the Ontario County Court in Regina v. Communicomp Data Ltd. (1974), 6 O.R. (2d) 680. Communicomp Data had been charged with operating a broadcasting undertaking contrary to s. 29(3) of the Broadcasting Act and ss. 3 and 11 of the Radio Act. Communicomp's operation involved the reception of signals from Canadian and U.S. stations and the distribution of such signals to subscribers via coaxial cable. Communicomp argued that its undertaking did not constitute a broadcasting receiving undertaking and that therefore federal regulation of the enterprise was ultra vires. The Ontario County Court held that the principle of federal jurisdiction articulated by the Privy Council in the Radio Reference in relation to the transmission of radio signals applied with equal force to the transmission of television signals. It determined further that the fact that ultimate distribution of the signal was by coaxial cable rather than through air was, for jurisdictional purposes, immaterial. The cable, regarded as a mere physical conduit for the transmission of signals, was characterized as an integral element of the broadcasting undertaking and therefore subject to exclusive federal jurisdiction.

The inclusion of cable systems within broadcasting undertakings was subsequently endorsed by the Supreme Court of Canada in Capital Cities Communications Inc. et al. v. Canadian Radio-Television Commission et al. (1977), 36 C.P.R. (2d) 1. Rogers Cable TV Ltd. and two affiliates had

applied to the CRTC for a licence amendment permitting random deletion of U.S. Commercials. Three of the American stations affected by the proposed amendment challenged its validity on five grounds, one of which addressed the constitutional validity of the Broadcasting Act in relation to cable operations. A majority of the Supreme Court rejected the argument of Rogers Cable that the enterprise could be severed into two distinct entities - reception of signals at the antenna (federal) and distribution of signals within provincial boundaries. According to Chief Justice Laskin the pragmatic analysis of the Privy Council evident in the Radio Reference was

"...even more applicable here to prevent a situation of divided jurisdiction in respect of the same signals or programs according to whether they reach home television sets and the ultimate viewers through Hertzian waves or through coaxial cables. (at p.14)

The physical aspects of the cable operation were characterized as functionally integrated with the broadcasting enterprise since, in the opinion of the majority,

"Essentially a CATV system no more than enhances the viewer's capacity to receive the broadcaster's signals ... The systems are clearly undertakings which reach out beyond the Province in which their physical apparatus is located ... The fallacy in the contention ... of the appellants is their reliance on the technology of transmission as a ground for shifting constitutional competence which the entire undertaking relates to and is dependent on extra-provincial signals which the cable system receives and sends on to its subscribers." (at p.14)

An analogous conclusion was reached by the Supreme Court in Regie des Services Publiques et al. v. Dionne (1977), 38 C.P.R. (2d) 1, decided contemporaneously with Capital Cities. On behalf of the majority, Chief Justice Laskin observed:

"...more [should] be said here [about] the provincial submission [that] since the cable distribution operation was locally situate and limited in its subscriber relations to persons in Quebec it was essentially a local work or under-

taking within provincial competence... The fundamental question is not whether the service involved in cable distribution is limited to intraprovincial subscribers or that it is operated by a local concern but rather what the service consists of ... Divided constitutional control of what is functionally an interrelated system of transmitting and receiving television signals, whether directly through air waves or through intermediate cable line operations, not only invites confusion but is alien to the principle of exclusiveness of legislative authority, a principle which is as much fed by a sense of the constitution as a working and workable instrument as by a literal reading of its words." (at p.9)

The combined effect of Communicomp Data, Captial Cities and Dionne demonstrates that federal jurisdiction over the mechanical aspects of a broadcasting undertaking includes not only transmitter and receiving apparatus but also encompasses cable operations which though local works, are functionally connected to interprovincial undertakings to the extent that such operations utilize broadcast signals. Where the service provided is broadcasting, even if, as in Dionne only a small percentage of programming results from off air transmission, then the entire system, including the local element, is subject to federal control.

Similar reasoning has been invoked to determine jurisdiction over content, although it may be arguable that there exists a greater degree of judicial responsiveness to localized concerns. In 1973 in Re C.F.R.B. and A.G. for Canada, [1973] 3 O.R. 819, the Ontario Court of Appeal ruled that federal jurisdiction in relation to radio communications was not restricted to the physical system but subsumed regulation of content on the basis that:

"...it would be flying in the face of all practical considerations and logic to charge Parliament with the responsibility for the regulation and control of the carrier system and to deny it the right to exercise legislative control over what is the only reason for the existence of the carrier system, i.e. the transmission and reception of intellectual material." (at p.824)

Identical sentiments were expressed by a majority of the Supreme Court in Capital Cities: (at pp.15-16)

"... Nor can the contention that Parliament cannot regulate program content but only the equipment or machinery be accepted... To put the matter in another perspective, it would be as if an interprovincial or international carrier of goods could be licensed for such carriage but without federal control of what may be carried or of the conditions of carriage. This submission amounts to a denial of any effective federal legislative jurisdiction of what passes in interprovincial or international communication ... Programme content regulation is inseparable from regulating the undertaking through which programmes are received and sent on as part of the total enterprise."

However, federal jurisdiction over the content of radio communications while extensive is not exclusive. In Attorney-General of Quebec v. Kellogg's Company of Canada (1978), 19 N.R. 271 a majority of the Supreme Court of Canada sustained a Quebec law prohibiting the use of cartoons in advertising directed at children in any media. The Court characterized the 'pith and substance' of the enactment as consumer protection, a matter falling within either 'property and civil rights' in the province or 'local and private matters'. The impact upon broadcasters was regarded as merely incidental since, in the opinion of the majority,

"... this regulation does not seek to regulate or to interfere with the operation of a broadcast undertaking. In relation to the facts of this case, it seeks to prevent Kellogg from using a certain kind of advertising by any means ... The fact that Kellogg is proscribed from using televised advertising may, incidentally, affect the revenue of one or more television stations but it does not change the true nature of the regulation... Kellogg is not exempted from the application of restriction upon its advertising practices because it elects to advertise through a medium which is subject to federal control..." (at p.286)

The implications of the Kellogg's case have not been fully explored. Since the law in question was directed to advertisers and not to the broadcasting undertaking itself and since the prohibition against advertising applied irrespective of medium, it was perhaps relatively

simple for the majority of the Court to conclude that the law did not impair broadcasting per se as a federal instrumentality. However, the decision may be interpreted as presaging a greater judicial toleration, or at the very least acknowledgement, of the local interests implicated in radio communications.

The reach of federal jurisdiction in relation to radio communication may be summarized by the following propositions:

1. According to the Radio Reference, jurisdiction is derived from the power in relation to both the 'peace, order and good government of Canada' and to inter-provincial undertakings. A succession of cases have confirmed that the combination of these two bases of authority may be sufficient to embrace all facets of the technical aspect of radio communications.
2. Any use of a signal which is under federal jurisdiction will support the assertion of federal competence in relation to the entire activity.
3. Federal jurisdiction extends to regulation of content although in this respect, the Kellogg's case would appear to indicate that a province may exert a legitimate effect upon content if such impact is characterized as incidental. This concurrent authority would, of course, be subject to the operation of the doctrine of paramountcy.

(b) Provincial and Municipal Jurisdiction

Since the Radio Reference, there has been no serious challenge to exclusive federal authority to license and regulate users of the radio frequency spectrum to avoid interference between individual users and between Canada and other countries. Licensing authority in this respect includes television broadcasting stations and, as well, cable television broadcasting undertakings (even those which limit antenna reception to signals originating within the same province). While jurisdiction over broadcasting content is, to a certain degree functionally concurrent, federal control over the physical broadcasting apparatus has been regarded as exclusive.

The exclusivity of federal constitutional authority should not, however, be construed as a denial of the existence of compelling local interests, both provincial and municipal. While broadcasting undertakings clearly possess economic and cultural dimensions justifying provincial regulation, with respect to the physical apparatus, municipal concerns may be even more prominent. As observed earlier, the erection of radio communication facilities directly impinges upon the recognized capacity of municipalities to regulate local commercial activities, to protect the health and safety of its residents, to stipulate land use and maximize property values, and to generate revenue to be applied to local purposes. While the integrality of the technical facet of broadcasting and its national and international dimension militate in favour of centralized jurisdiction, complete preclusion of the expression of provincial and municipal interests in certain phases of radio communication would result in the erosion of the exercise of constitutionally vested authority and create an imbalance in the federal/provincial distribution of power.

Section 92 of the Constitution Act, 1867 contains certain provisions which would, at first glance, support local claims to regulation. Of these provisions the most potentially significant are:

1. s. 92(10): Local Works and Undertakings
2. s. 92(13): Property and Civil Rights
3. s. 92(16): Matters of a Local or Private Nature.

While these sections describe provincial grants of legislative authority, they are also material in terms of the powers afforded to a municipal corporation. Since a municipal corporation exercises its jurisdiction through a delegation from the provincial legislature (and is restricted in the exercise of such powers by the terms of the enabling provincial legislation) municipal by-laws purporting to regulate radio communication

undertakings proceed from the same constitutional source as provincial legislation addressed to radio communications.

Of the constitutional provisions noted above, sections 92(13) and 92(16) are of greatest relevance. While section 92(10) conceivably supports provincial, and by implication municipal, authority in relation to physical apparatus, its utility has been greatly restricted, if not wholly eliminated by the Radio Reference in which the Privy Council repudiated the notion that the receiving apparatus could be characterized as a 'local work':

"The argument of the Province really depends on making ... a sharp distinction between the transmitting and the receiving instrument. In their Lordships' opinion this cannot be done. Once it is conceded, as it must be, keeping in view the duties under the convention, that the transmitting instrument must be so to speak under the control of the Dominion, it follows in their Lordships' opinion that the receiving instrument must share its fate. Broadcasting as a system cannot exist without both a transmitter and a receiver... The system cannot be divided into two parts, each independent of each other." (at pp.85-86)

In contrast, the broad grants of legislative authority effected by sections 92(13) and (16) afford a more fruitful source of competence. The combination of these two heads of authority empower local governments (both provincial and municipal) to regulate a wide variety of matters such as land use, commercial activities, health, safety and private rights, all of which are implicated, in the physical apparatus of radio communication. And in this respect, it is significant that no decision has yet been rendered by the Supreme Court of Canada which determines the relationship of sections 92(13) and (16) to the physical apparatus of radio communication in any context other than that at issue in the Radio Reference itself. Consequently, while the range of federal power may be discerned with relatively little difficulty, the nature and extent of municipal competence is less clear. The paucity of litigation may be explicable as the product of several factors: a lack of understanding on

the part of all parties as to their respective rights under the present constitutional framework; and, as a corollary, a tendency to resort to political, rather than legal, solutions to resolve jurisdictional uncertainty.¹¹¹

However, the preceding discussion is not intended to suggest that either municipal or provincial authorities have completely abdicated any claims to regulatory competence in relation to radio communications. While most of the federal/provincial controversies have been addressed to content (and therefore will not be further considered) the advent of CATV has prompted a reconsideration of the strength of municipal interests in regulation of physical apparatus. Technological developments coupled with recent trends of judicial interpretation may therefore be relied on to support an enlarged basis for the assertion of local jurisdiction.

As a preface to any discussion of the scope of provincial and municipal authority it is first necessary to locate the Radio Reference in the context of general principles of constitutional law. Although the question posed to both the Supreme Court and the Privy Council concerned the respective jurisdictions of both federal and provincial governments in relation to radio communications, both courts perceived that the criterion of jurisdiction was that of aspect. As observed by Anglin, C.J.C.:

"Dealing with the first question, the most important thing to observe would seem to be its subject matter. It does not concern the rights of property in the instruments used for communication, their ownership, or civil rights in regard to

111 See the commentary by R. Shaw, "Municipal Regulation of CATV" (1970), 2 Comms. L. Rev. 70; R. Atkey, "The Provincial Interest in Broadcasting under the Canadian Constitution" (1969), 1 Comms. L. Rev. 212; K. Alyluia, "Constitutional Aspects of Cable Television" (1969), 1 Comms. L. Rev. 47; D. Mullan, "The Constitutional Implications of the Regulation of Telecommunications" (1973), 1 Queens L.J. 67; R.P. Doherty, "The Case for Provincial Regulation of Community Antenna Television Systems" (1979), 5 Dal. L.J. 760.

them. In other words, it is "radio communication" that is dealt with by this question, rather than the instruments employed in making it, which are alluded to merely incidentally." (at p.866)

In other words, the effect of this and subsequent decisions is not necessarily to confide the entire factual subject matter of radio communication to Parliament but merely the radio communication elements of the enterprise.

Parenthetically, it is worth observing that the possibility of a certain level of provincial regulation of federal undertakings had in fact been anticipated in 1905 by the Privy Council in Toronto Corp. v. Bell Telephone Co. (referred to previously). While the Privy Council held that the Company was entitled as of right to enter upon the streets and highways of the city to construct conduits, lay cables and erect poles, it was noted that a certain authority (albeit contingent) existed in the municipality:

"[to] give the Council a voice in determining the position of the poles in streets selected by the Company and possibly in determining whether the line in any particular street is to be carried overhead or underground." (at pp.60-61)

Since radio communications as interprovincial undertakings are not, therefore, per se immune from the operation of provincial laws, the application of conventional principles of constitutional interpretation would appear to dictate the following tentative conclusions. First, in a negative sense the primary restriction placed upon localized control by the Radio Reference relates to the capacity of either a province or a municipality to enact laws directly affecting a broadcasting undertaking. Such laws would obviously be ultra vires in inception. Secondly, in an affirmative sense, federal broadcasting undertakings will be subject to provincial and municipal laws of general application unless the effect of such laws is to 'sterilize' the undertakings, and, even more significantly, in theory, local authorities ought to be able to regulate a broadcasting undertaking if the legislation represents a legitimate

exercise of a head of power contained in section 92 and if the impact upon the 'broadcasting' aspect of the Federal operation is merely incidental. In such a case the operation (as opposed to the validity) of the law would depend upon the existence of potentially conflicting Federal law.

The line of demarcation between federal and municipal authority would therefore be determined by an analysis of the interests implicated in any enactment: that is, is the subject matter in pith and substance 'radio communications' or does the subject matter relate to the non-communication aspect of a radio communication undertaking. The distinction is one simple to express but difficult to apply as a brief examination of cases concerning municipal regulation of radio communications reveals.

For purposes of analytic convenience, cases involving challenges to the validity of municipal by-laws directed to or incidentally affecting physical apparatus may be divided into two groups: those in which regulation relates to the viability of the business enterprise; those in which the regulation is addressed to the physical facility itself.

Illustrative of the first group is the decision of the British Columbia Court of Appeal in Re Public Utilities Commission and Victoria Cablevision et al. (1965), 51 D.L.R. (2d) 716.

Pursuant to section 10 of the Public Utilities Act, R.S.B.C. 1960, c. 323, the Public Utilities Commission served a demand on cable television operators for certain information related to subscribers, history of operations and subscription rates. All companies refused to divulge the information alleging immunity from provincial jurisdiction. The British Columbia Court of Appeal accepted the argument of the companies. Applying the reasoning of the Radio Reference the Court characterized the cable operation as an integral component of 'broadcasting' and concluded:

"If the cables and rentals paid by the customers were subject to provincial legislation, then the legislature could restrict the right conferred by the Dominion. The Public

Utilities Act, if applicable, would impose restrictions upon the respondents as follows: to furnish adequate service, not to abandon a service without permission to the Commission, to obey orders of the Commission, to furnish information to the Commission, not to begin construction or operation without a certificate of public convenience and necessity from the Commission, to charge rates fixed by the Commission; such sections even if applied to cables and rentals only, must operate upon the antennae to such extent as to invoke the comments of Lord Porter, "but can you emasculate the actual undertaking and yet leave it the same undertaking." In other words, if the Provincial Legislature's purpose is to operate on the cables and rentals, nevertheless it must affect the operation of the antennae so as to entrench upon section 92(10)(a) and therefore to enact that which is ultra vires of the Province and within the exclusive legislative jurisdiction of the Dominion." (at pp.719-720).

The reasoning of Victoria Cablevision was subsequently adopted in Re Oshawa Cable T.V. Ltd. and Town of Whitby, [1969] 2 O.R. 18 in which the Ontario High Court found that refusal by the town council to allow a cable operator to erect equipment without a permit exceeded the powers of the municipal corporation and was additionally an unconstitutional interference with a federally-regulated undertaking.

Only one case exists to support the proposition that municipalities may regulate the commercial aspects of a broadcasting undertaking, that of R. v. City of New Westminster (1966), 55 D.L.R. (2d) 613 (B.C.C.A.). A federally incorporated cable television company holding a Department of Transport licence had applied for and been refused a municipal trade licence. The Company subsequently challenged the applicability of the City's trade licence by-law on the basis that it was both federally incorporated and, as a broadcasting undertaking, within exclusive federal jurisdiction. The Court of Appeal sustained the by-law on the basis that, since the broadcasting licence did not specifically exclude the company from provincial control, it was bound by relevant provincial laws and municipal regulations concerning business operations. This decision, which has been extensively criticized, is inconsistent with the bulk of authority and contradicted by subsequent decisions and must therefore be regarded as an anomaly. What can one conclude with respect to municipal

competence to regulate the undertaking through licensing schemes related to the commercial aspects of physical structures? If the effect of the municipal by-law is to prohibit the capacity of the undertaking to engage in operations without a permit then the by-law will be held inapplicable on the principle of interjurisdictional immunity. Furthermore, attempted regulation of the 'communication' facets of the enterprise (such as rates, subscribers, etc.) will, according to Victoria Cablevision be construed as ultra vires efforts to legislate in relation to 'radio communication'. Illustrative is the unreported decision of the Supreme Court of Ontario (Jan. 10, 1981) in Grimsby v. Rogers Radio Broadcasting Limited. At issue was the effect of a zoning by-law governing land use upon the erection of transmitting antennae and related facilities. In the view of Craig J. "...the by-law is not expressly directed towards regulating broadcasting and transmitting facilities of the type licensed by C.R.T.C." but is "a general zoning by-law in which the erection of broadcasting and transmitting facilities is not a permitted use." Since the Radio Reference had established exclusive federal control over radio communications as a matter within 'peace, order and good government' and section 92(10)(a) the Court concluded that "the by-law (though not void) is ineffective to the extent that it conflicts with the proposed use by the defendant." The Grimsby decision provides a contemporary parallel to that of Bell Telephone insofar as it supports the proposition that municipal efforts to determine the site of physical apparatus will be suspended, if framed as a law of general application. By extension, a municipal zoning by-law addressed specifically to prohibit the siting of radio antennae would clearly be invalid.

The cumulative effect of these cases confirms the description of municipal competence in relation to regulation of the physical apparatus provided by Peter Grant in 1970. Although his conclusions refer specifically to the matter of cable television operations, the underlying

principles appear equally applicable to radio transmitting and receiving devices. According to Grant:112

1. A municipality cannot validly prohibit a federally-licensed CATV operator from commencing operation within the municipality, whether by a general prohibitory by-law or by setting up a licensing system which enables the council to refuse permission to an otherwise qualified applicant.
2. A municipality, if given this authority by the province, can, however, set reasonable restrictions on the use of its highways by CATV operators and can probably enforce these restrictions by requiring the operator to obtain municipal permission before proceeding to construct his plant.
3. The restrictions permitted to be imposed on the use of municipal highways, easements and airspace by CATV systems must be reasonably related to such matters as public safety, traffic control, maintenance and upkeep of the highway, and perhaps aesthetic value. The restrictions must not be unreasonable or discriminatory, but might include such requirements as:
 - (a) the overall coordination of the work through the supervision of a municipal official so that pole erection or plant construction can take place in conjunction with similar work by hydro or telephone companies.
 - (b) the prior notification and arrangement with municipal officials if or when traffic is to be stopped or impeded and the provision that this be done in accordance with local police requirements.
 - (c) the posting of a bond and/or the obtaining of liability insurance to ensure that the erection and maintenance is carefully done, and that no loss or injury be done to the public, and that whatever repairs are necessary to restore the street to a proper condition will be performed.
 - (d) safety restrictions (subject to any federal regulations on the question) requiring cables over streets to be a minimum height, or that

poles be built within certain stress or construction standards, or that electrical outlets be properly grounded or protected.

4. Municipal restrictions or by-laws affecting CATV operators will probably be held to be inoperative if they

(a) affect subscriber rates or installation charges

(b) require an operator to use municipal utility commission poles (although if no other poles are in fact available, the operator may find himself obliged to negotiate for their use out of economic necessity)

(c) require an operator to set aside one or more channels for municipal or educational use, or require other programming commitments;

(d) require an operator to provide service free to schools or other institutions;

(e) relate to the operation, management or ownership of the CATV undertaking - e.g. requiring local ownership or financing, or requiring ownership in the cable to revert to the town;

(f) make municipal permission conditional upon the execution of a contract between the operator and the municipality stipulating any of the above requirements.

The Case for a Greater Municipal Role

Recent trends in constitutional interpretation would appear to buttress provincial and municipal claims to greater involvement in regulation of physical apparatus, including antenna structures. Although, as observed earlier, the Supreme Court of Canada has yet to directly consider the interaction of federal jurisdiction over the physical aspect of radiocommunications and provincial and municipal interests in the regulation of land use, development and related matters, certain developments in fields of federal

competence analogous to radiocommunications suggest an increased judicial responsiveness to local concerns.

The case of aeronautics is instructive. Since its inception, the subject matter of aeronautics has been considered to be within exclusive federal jurisdiction. In Re Regulation and Control of Aeronautics in Canada, [1932] A.C. 54 (decided four months prior to the Radio Reference), the Privy Council held that a Parliamentary enactment implementing the provisions of an international convention on aeronautics was valid either by virtue of the treaty power in section 132 of the Constitution Act, 1867 or as a matter related to the peace, order and good government of Canada. Subsequently in Johannesson v. West St. Paul, [1952] 1 S.C.R. 292 the Supreme Court of Canada referred to 'peace, order and good government' as the sole basis for federal competence due to the characterization of air traffic as a subject which "goes beyond local or provincial concern or interests and must from its inherent nature be the concern of the Dominion as a whole." (at 308) The federal interests in regulation of air traffic are both obvious and compelling: the need to rationalize airline routes and to license interprovincial and international carriers. However cases subsequent to Johannesson expanded the subject matter of aeronautics to include a host of activities, normally within provincial jurisdiction, on the basis that such matters were necessarily incidental to the exercise of federal jurisdiction. While the inclusion within aeronautics of airport location, hangars and noise pollution is readily classified as integral to air traffic, at one point, judicial interpretation expanded the power to encompass all matters factually connected to aeronautics even if, on an objective basis, such phenomena exhibited only a tenuous connection with air traffic. The zenith of this approach may be detected in a trilogy of cases in which the labour relations of municipal employees working at a federal airport,¹¹³ employees working for a company whose main business was the

113 Re City of Kelowna and C.U.P.E. Local 338 (1974), 42 D.L.R. (3d) 752 (B.C.S.C.).

servicing and maintenance of aircraft¹¹⁴ and employees of a company whose main business was the sale of aircrafts¹¹⁵ were held to fall within exclusive federal jurisdiction.

However, the Supreme Court of Canada has recently drawn back from this position. In Construction Montcalm Inc. v. Minimum Wage Commission, [1979] 1 S.C.R. 754, the court held that provincial minimum wage legislation applied to workers employed by a Quebec building contractor who, under contract with the federal Crown, was engaged in construction work on runways of an international airport. While in many earlier cases "even the slightest factual suggestion of an airplane, airport or something even remotely connected with aviation ... triggered an automatic judicial reaction against the applicability of provincial legislation"¹¹⁶, Beetz J., for the majority, was prepared to hold only that an otherwise valid provincial law would only be inapplicable to a federal undertaking "if it is demonstrated that federal authority over these matters is an integral element of such federal competence." The determination of which phenomena were to be classified as integral was articulated by Beetz, J.:

"The construction of an airport is not in every respect an integral part of aeronautics. Much depends on what is meant by the word 'construction'. To decide whether to build an airport and where to build it involves aspects of airport construction which undoubtedly constitute matters of federal concern... This is why decisions of this type are not subject to municipal regulation or permission... Similarly, the design of a future airport, its dimensions, the materials to be incorporated into the various buildings, runways and structures, and other similar specifications are, from a legislative point of view [are]... matters of exclusive federal concern. The reason is that decisions made on these subjects will be permanently reflected in the structure of the finished product

114 Re Field Aviation Co. (1974), 49 D.L.R. (3d) 234 (Alta. C.A.).

115 Re Staron Flight Ltd. (1976), 73 D.L.R. (3d) 78 (B.C.S.C.).

116 J. MacPherson, "Developments in Constitutional Law" (1980), 1 Supreme Court L. R. 77 (at p.85).

and are such as to have a direct effect upon its operational qualities and, therefore, upon its suitability for the purposes of aeronautics. But the mode or manner of carrying out the same decisions in the act of constructing an airport stand on a different footing..." (at pp.770-771)

In other words, the location and scope of federal jurisdiction turned upon an assessment of the relative weight of the competing federal and provincial interests.

The significance of the Montcalm decision consists first in the judicial repudiation of the notion that federal undertakings constitute 'enclaves' immune from the operation of provincial laws of general application. Just as courts have recognized that federal control over such matters as Indian reserves, harbours and railways does not shield these areas from provincial jurisdiction (see generally Hamilton Harbour Commissioners v. Corp. of City of Hamilton (1977), 1 M.P.L.R. 133) Montcalm raises the possibility of a similar subjection of air-traffic related activities to local regulation. Secondly, and even more critically, Montcalm institutes a more rigorous test for the determination of the scope of 'aeronautics'. In dispensing with factual connection as a sufficient condition of federal jurisdiction and concentrating instead upon considerations of interest, the decision represents a shift in judicial interpretation in favour of a more balanced view of federal/provincial relations.

Such a decision has critical implications for decentralized regulation of the physical facets of radiocommunication. To a large degree the capacity of a municipality or province to regulate such federal undertakings is contingent upon the meaning to be attributed to the term 'radiocommunication.' The broader and more numerous the parameters of this topic, the greater the likelihood that relevant provincial or municipal laws will be held inoperative (on the basis of the theory of interjurisdictional immunity) or be classified as ultra vires. Conversely, if federal jurisdiction is restricted to those properties of the physical apparatus which bear directly upon the communications function, a greater latitude may be permitted for the expression of legitimate local concerns.

While it is beyond the scope of this paper to identify with any degree of precision which attributes of the physical apparatus are essential to the communicative function and which are merely peripheral, some guidance may be derived from the Radio Reference itself and the quality of the federal interests identified therein. If, as suggested by the Privy Council, the primary rationale militating in favour of centralized authority and against shared jurisdiction was located in the need for a single body capable of implementing international obligations respecting frequency assignment, spectrum management and interference, then it is evident that by analogy to Montcalm, federal jurisdiction must be exclusive with respect to all matters directly implicated in the efficient and co-ordinated management of radio signals (in both programme and non-programme uses). This jurisdiction would therefore include the certification of operators, assignment of frequencies, antenna siting, regulation of radiation emissions and conformity with aviation standards.

Recognition of the exclusivity of federal jurisdiction in relation to these matters does not, however, completely exhaust the ambit of the technical aspects of radiocommunication. The limitation of Parliamentary jurisdiction in this area to those attributes of apparatus integrally related to the radiocommunication activity results in a relatively large area available for the exercise of municipal regulation. For example, the federal interest in aesthetic values would seem to be negligible inasmuch as the visual appearance of physical apparatus does not generally relate to communication capability. Antenna height may be anomalous in this respect since height does affect transmission capability. Subject to this exception it is arguable that municipal by-laws regarding the visual appearance of radio apparatus ought to be constitutionally valid. Analogously, municipalities have strong claims to enact certain safety-based regulations minimizing the hazards posed by radiocommunications structures. While such competence would not include structural considerations intrinsically connected to radiocommunications, it would arguably extend for example to such matters as set-back regulation and the imposition of the requirement of anti-climb devices where appropriate. Municipal and provincial jurisdiction over such species of structural

considerations could be supported either as an incident of section 92(10)(a): "Local Works and Undertakings" or section 92(13) "Property and Civil Rights."

Between these two extremes of evident federal and equally evident local concerns there exists a region characterized by jurisdictional obscurity. It is simply impossible to predict the ultimate locus of constitutional authority in relation to matters such as electrical safety and structural standards, in respect of which federal and provincial interests are equivalent. It may well be that in such cases jurisdiction is concurrent.

Conclusion

The current system is unsatisfactory for a number of reasons. First, it is characterized by a high degree of confusion and uncertainty with respect to the limits of provincial control. In the absence of any authoritative judicial statement respecting local authority over aspects which are at best ancillary to the radiocommunication function (such as aesthetics and safety), difficult questions of regulatory competence remain unanswered. The possibility that jurisdiction in such areas may be concurrent does not wholly resolve the issue. While the recognition of concurrent control permits the expression of localized concerns, it increases "the interdependence of the two levels of government and therefore also increases the amount of co-operation and negotiation needed to make the system work. Jurisdictional confusion and confrontation might well be the result."¹¹⁷

Secondly, and more significantly, since the current constitutional framework clearly denies the relevance of local interests relative to certification of operators, antenna location and frequency assignment, the claims of regional diversity and controlled land use continue unrecognized. Although the rationale supporting federal exclusivity in this field is unassailable, local concerns are of pragmatic if not legal significance. At

¹¹⁷ Fletcher, supra, footnote 94 at p.185.

present, the constitutional division of authority raises the clear possibility of incompatibility between the location of such federal undertakings and local land-use schemes.

To the degree that the present division of powers does not afford meaningful opportunity for the expression of local concerns, a political solution may be demanded. What might be the salient features of such a solution? In the first place, any political mechanism must comply with the necessity of accountability. The need to ensure accountability and avoid confusion argues in favour of a single-tier rather than two-tiered system of regulation. Secondly, the significance of radiocommunications to national development and the character of the technology suggests that the responsible body ought to continue to be an agency of the federal government.

However, in order to accommodate diverse localized concerns, the institution of formal consultative mechanisms appears desirable as a way of encouraging co-operation in those areas in which local interests are politically, if not constitutionally, significant - for example, structure location and physical characteristics. Such a solution would have clear advantages: it would permit retention of technical control by the central government, allowing for the co-ordinated development of communications systems. It would, however, ensure an avenue for the voicing of local interests, an opportunity currently not mandated by the constitution, and thus minimize the likelihood of conflict between the two levels of government.

While determination of the precise nature of local representation in antenna siting and structural decisions is beyond the scope of this paper, it is worth observing that a rudimentary consultative structure already exists in the area of airport location. Jurisdiction over airport location functionally parallels jurisdiction in relation to antenna siting. Not only is the source of federal power in relation to aeronautics and radiocommunications derived from 'peace, order and good government' (although with respect to radiocommunications, federal jurisdiction is additionally supportable under section 92(10)(a)), but judicial decisions concerning the legitimacy of provincial and

municipal regulation of the physical facilities are identical in their denial of local competence.

In Johannesson v. West St. Paul, [1952] 1 S.C.R. 692, a municipal by-law expressly prohibiting the construction of airports within certain areas was invalidated as an unconstitutional encroachment upon the federal power in relation to aeronautics. The principle of federal exclusivity has, however, been extended beyond the relatively straightforward factual situation presented by Johannesson. In Re Orangeville Airport Ltd. and Caredon (1976), 11 O.R. (2d) 546 (Ont. C.A.), the Ontario Divisional Court was confronted with a challenge to a municipal by-law which, although not expressly addressed to airports, zoned the area in which an airport was located as 'agricultural'. Pursuant to this by-law, the municipality refused to issue a building permit to a private airport for the construction of five new hangars, which had been approved by the federal Ministry of Transport. The by-law was not declared ultra vires but inapplicable:

"This is a case where the municipality, a creature of the province, has enacted a by-law which, though of general application, would with respect to buildings at an airport approved by the federal authority prohibit their erection. In my opinion, the by-law, though not ultra vires per se, is ineffective in this respect, and does not apply to the situation for which the building permits are required." (Divisional Court judgement is unreported)

The proposition that Parliament enjoys exclusive legislative power in relation to aeronautics and that, consequently, municipal zoning by-laws affecting the use of land for aviation purposes are either ultra vires or inoperative was recently endorsed in Re Walker et al. and Ministry of Housing for Ontario (1983), 41 O.R. (2d) 9 in which the Ontario Court of Appeal invalidated a municipal by-law which, rather than burdening, facilitated the use of airports. The comparison with antenna location-related issues is strengthened due to the similarity of the local interests implicated.

As a corrective to the constitutional preclusion of local concerns related to airport location and structures, formal and informal consultative models have been implemented. With respect to aerodrome sites belonging to or

leased to the Queen in Right of Canada and airports, section 4.4(3) of the Aeronautics Act requires that the Governor in Council, prior to imposing zoning regulations, must first attempt to reach an agreement with the relevant provincial government to provide for the use or development of the land. An informal consultative procedure is applied to zoning for land use for airport development of locations not owned or operated by Transport Canada, according to which:

1. The applicant is required to notify the land use/land planning authorities of a proposal to establish a certified aerodrome and to inform Transport Canada's Regional Office of the results.
2. When notice to the land use authority has not occurred or the applicant has not provided results of the notification, the Regional Office will advise the concerned local authorities. The applicant will be advised of the intent to discuss the development with local authorities and will be invited to participate.
3. If the land use authorities are opposed to the establishment of a certified aerodrome the aerodrome certificate will not be issued by the Regional Office and the matter will be referred to Transport Headquarters for resolution.

Such procedures, while ensuring retention of ultimate zoning authority in federal hands permits de facto intervention by local bodies and in this way achieves a partial accommodation of federal desires to rationalize air routes and ensure operational safety and local wishes to implement coherent land use development.

This precedent may serve as a valuable model for reconciliation of federal and municipal concerns in the area of radiocommunication. Although other, more formal, techniques might be considered - such as delegation, federal/provincial accords - the institution of a consultative process, administered by federal authorities but allowing for the representation of

local interests, may provide a rational alternative to the situation produced by the present constitutional structure.

IV. REGULATION OF RADIO ANTENNAE AND THEIR SUPPORT STRUCTURES IN THE U.S.A.

Constitutional Division of Authority of Matters Affecting Radiocommunications

Pursuant to the authority expressly delegated by the United States Congress in the Communications Act of 1934¹¹⁸, the Federal Communications Commission (FCC) manages and authorizes the use of the radio frequency spectrum. The enabling provisions contained within this legislation permit the F.C.C., through its various authorization and control programs and rules, to regulate the use of radio frequencies, bandwidth, signal power and direction, and sources and levels of harmful interference. As a necessary incident to these programs and rules, the F.C.C. also regulates certain aspects of the siting, height, safety and appearance of radio antennae and their support structures.

Local or municipal governments in the United States are vested with the authority to make ordinances (by-laws) and other regulations through an express delegation of such power as set out in the constitution of the state in which the city or county is located. Thereby, municipalities are authorized to make and enforce local, police, sanitary and other ordinances which apply only within their geographical limits, provided they do not conflict with the general laws of the state.

The police powers¹¹⁹ delegated to local governments give them the jurisdiction to make and enforce rules relating to the health, safety and aesthetics of buildings and structures. In the U.S.A., it has been an accepted constitutional principle, since the 1920's, that included within the police powers of local governments is the right to regulate many aspects of the siting, instal-

118 Communications Act of 1934, 47 U.S.C. (as amended).

119 Under the U.S. constitutional system, "police power" represents the authority conferred upon state governments to restrain individual freedoms and property rights in order to achieve safety, health, moral and general welfare objectives. These explicit and inherent constitutional powers are delegated by individual states to their respective local governments.

lation, erection and operation of radio antennae and their support structures. Therefore, there exists great potential for the objectives and rules of the federal government to conflict with those of the thousands of local administrations across the country. As one might expect, constitutional and other principles and rules have evolved to resolve these conflicts and clarify rule-making responsibilities.

Constitutional Principles and Rules

At the federal level, the F.C.C. is limited to the powers which are expressly set out in the Communications Act of 1934 and any other legislative instruments enacted by Congress¹²⁰. It has no inherent powers of its own.

Constitutionally speaking, the very existence of a federal rule or regulation does not, in of itself, preclude lawmaking by a local government in relation to that subject. A high level of concurrent regulation is an accepted part of constitutional law in the United States. Federal law is supreme or paramount where there is a clear intention, expressed or implied, to occupy an entire field or a specific aspect of regulation¹²¹. A clear intention may appear in the enabling legislation itself or the F.C.C. may issue an explicit statement that, pursuant to some enabling provision, it is preempting local regulation in relation to some matter. The First (freedom of expression), Fifth (equal protection) and Fourteenth (due process) Amendments to the U.S. Constitution limit both the actions of the F.C.C. and local governments¹²².

120 An example of a recent enactment is the Communications Amendment Act, Public Law 97-259 (adopted September 13, 1982) which clarifies the F.C.C.'s jurisdiction over the susceptibility of home entertainment devices to radio energy.

121 The Supremacy Clause (Article Six, Section 2) of the U.S. Constitution ensures that the federal law will prevail.

122 These amendments do place significant limits on the ordinance-making powers of municipal governments. Examples of general limitations which have evolved over time to invalidate local

In relation to radio antennae and their support structures, it is legally accepted that the F.C.C. does not fully occupy and has not preempted generally this area of regulation. Therefore, lawfully enacted local by-laws and other rules, which do not conflict or unreasonably interfere with existing federal rules and objectives, may be created in relation to the location, height, aesthetics and safety of antennae and their support structures. The pattern of regulation which has developed from these principles now follows.

The Regulatory Realities

The current realities of who is regulating what in relation to antennae in the United States today are a result of the application of the constitutional principles previously discussed, a number of legal decisions and, to a certain extent, a historical and evolving pattern of regulation which has been accepted by all concerned as a reasonable and legitimate use of federal and municipal power.

(a) The Powers of the Federal Government

(i) Interference Management

Legal precedent, decided over a number of years¹²³, has

ordinances will render inoperative by-laws which are arbitrary, unreasonable, capricious or discriminatory; effectively undermine the value of land without due process and compensation; which unreasonably restrict competition, prohibit a legitimate use of land on aesthetic grounds alone, and impose greater restrictions on the use of land than are necessary to achieve legitimate local interests.

123

Some cases go back to the 1920's. Recently, doubts were raised about whether ordinances could manage radio interference when a county in Oregon attempted to regulate interference between two FM radio stations. The FCC issued a declaratory ruling which stated that the federal government must have and does have exclusive jurisdiction to manage radio interference. See: In the Matter of 960 Radio, Inc., Licensee of Station KJSN(FM), Klamath Falls

established that managing interference to and from radio devices is exclusively within the powers of the federal government. Local ordinances which require radio operators to cease operation or pay fines due to interference are inoperative.

(ii) Location of Antennae and their Structures

The Federal Communications Commission does not assign or select the location for radio antennae - other than for its own. The Commission does either issue or deny a construction permit and/or licence. This permit amounts to federal authority to locate an antenna up to a certain height at a particular geographical location¹²⁴.

The enabling provision which gives the F.C.C. its discretion to grant or deny a permit is couched in extremely wide terms¹²⁵. The scope of this provision gives the Commission the authority to site

Oregon, F.C.C. 85-578 (released November 4, 1985) The General Counsel's office of the F.C.C. now sends out a standard form letter upon being informed of such ordinances. The letter informs the municipality that the F.C.C. fully occupies this field of regulation, so that concurrent legislation is not acceptable. References to very early cases of local attempts to control amateur radio can be found within R. Palm, F.C.C. Rule Book: A Guide to F.C.C. Regulations 6th ed., American Radio Relay League, 1986 (at p.2.18).

124 47 U.S.C. s. 319 (a). Under the Act, the permit is actually authority to construct a station which includes the antenna system. The permit system is used for broadcasting undertakings and the licensing process authorizes the siting of the antenna system for most other types of radio stations. See 47 U.S.C. s. 319 (d).

125 Section 303 of the Communications Act of 1934 provides in part: "Except as otherwise provided in this Act, the Commission from time to time, as public convenience, interest or necessity requires, shall:

(d) Determine the location of stations....

or not site in the public interest generally. Therefore, rules and policies which go beyond the scope of spectrum management can be developed and applied.

Under current policy, construction permits are denied (inter alia) on the following grounds:

- (1) the radio signal cannot practically or lawfully be co-ordinated with other radio spectrum users
- (2) the environmental impact of the siting is not in the public interest (to be discussed)
- (3) the siting of the antennae or support structure is not in accord with municipal or state zoning or other laws
- (4) the antenna or support would constitute a hazard to air navigation (to be discussed)

It is not certain whether the third ground for refusing a construction permit is based upon a constitutional limitation or upon a long-standing deference to local planning. It is clear that for any particular application, the F.C.C. could preempt local ordinances prohibiting or restricting the use of a site for a radiocommunication tower but that it has ostensibly refused to do so¹²⁶.

For broadcasting undertakings the current authorization process ensures, through public notice and 'petition to deny' procedures,

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The F.C.C. has expressly preempted in part certain types of ordinances for amateur radio and satellite dish installations (to be discussed). The policy of total deference to local ordinances which do not unreasonably restrict the federal government's objectives was confirmed by at least three officials of the Commission during personal interviews.

that competitors to an application or the affected municipality will raise a conflict with zoning ordinances, if such exists.¹²⁷

(iii) Height of Antenna and Support Structure

The F.C.C. does not regulate the height of antennae or their support structures except in two respects. First, the Commission will ensure the height is the correct or minimum height to assure that the signal will correspond to the intended coverage area¹²⁸. Second, as previously stated, applications which pose a danger to air navigation will require amendment or be denied.

(iv) Co-location of Antennae

At the federal level there exists a general policy which states that the sharing of support structures or site is a desired objective. Beyond this, the F.C.C. can refuse a construction permit if a proposal threatens air navigation and an antenna farm located near by is reasonably available to the applicant¹²⁹. It appears to be settled policy that the Commission does not, and possibly cannot under current law, order tower or site sharing.

127 Applicant's must be able to prove, if challenged through a Petition to Deny process, that there is "reasonable assurance" that both the site and the support structure are available. This includes local government approvals and sufficient proprietary interest in the parcel(s) of land necessary. See: E.G. Krasnow and J.G. Bentley, Buying or Building a Broadcast Station: Everything You Want - and Need to know - But Didn't know Who to Ask, National Association of Broadcasters, (Washington, D.C.: 1982) (at p.25). See also: F.C.C. Form 301, Application For Construction Permit For Commercial Broadcast Station October, 1986 (at p.23). For the Petition to Deny process see: 47 C.F.R. s. 73.3584.

128 For an example of this policy, see the "central location doctrine for TV applications" as embodied in 47 C.F.R. 73.685(b). Also, AM radio tower height must correspond correctly to the frequency assigned by the F.C.C.

129 See: 47 C.F.R. s. 17.10

(v) Environmental Impact

The Federal Communications Commission is responsible for a multi-stage assessment and justification process which creates onerous study and information requirements for both the applicant and the Commission itself¹³⁰. The process is so onerous that upon every occasion when the eight preconditions under the regulation have been triggered, in all but two instances in the past thirteen years, the applicant has withdrawn the application or amended it so that an environmental assessment was no longer required¹³¹. The eight preconditions which trigger the process involve situations where the antenna proposal will: be located in a designated wilderness area; be located in a designated wildlife preserve; affect historic places or structures registered, or to be registered, in the National Register of Historic Places; be located in a floodplain; involve site preparations which will significantly change the existing surface features (i.e. drain and fill wetlands); be located in a residential area and be equipped with high intensity lighting; expose workers or the public to radio frequency emission levels which exceed ANSI STD C95.1-1982¹³²; and, in addition to the above, the F.C.C. itself may determine that a major environmental impact is likely and an assessment is therefore necessary.

130 The process is contained within 47 C.F.R. s.1. 1301 to s.1. 1319. The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 3432) requires all federal agencies to consider the environmental impact of their actions and authorization processes.

131 The statistic was obtained from an interview with an F.C.C. official in May of 1987. The option of amending the application so that the impact is below the threshold necessary to continue the assessment process is contained in rule 47 C.F.R. 1.1309

132 The standard is called; American National Standard Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz.

(vi) Safety Regulation

There are only two areas where the F.C.C. is directly involved in the safety aspects of antennae installation or operation. First, through its environmental impact process (discussed above) the Commission will not approve applications which will cause the levels of electromagnetic energy to which workers or the general public will be exposed to exceed current ANSI standard C.95.1-1985. (The Commission is currently reconsidering the extent of its involvement in this area.¹³³)

Second, under Part 17 of the F.C.C. Rules,¹³⁴ and pursuant to the authority in the Federal Aviation Act, the location, height and radio interference potential of new radio installations are reviewed to ensure that the proposal will not be a hazard to air navigation. Assessment of the potential for obstruction to air traffic is performed by the Federal Aviation Authority (F.A.A.), but it is the F.C.C. which controls the issuance of the construc-

133

As will be seen in the section on local government regulation, municipal governments have recently begun setting exposure protection levels which are more stringent and comprehensive than the F.C.C.'s. As a consequence, the National Association of Broadcasters (NAB) has requested that the F.C.C. expressly preempt local regulations in this area. This request is under consideration. See: F.C.C. Public Notice - 4198 Petition for Declaratory Ruling that Affect Communication Services to the Public, dated May 1, 1986. It should also be noted that the F.C.C. has just excluded a number of categories of applications from routine evaluation to ensure that they do not exceed the ANSI standard. The Commission will now perform routine evaluations on applications involving Parts 5, 25, 73 and 74 of the F.C.C. Rules. It continues to consider the need for protection from the emissions from ship earth stations and ship radar stations. For the latest pronouncements in these matters see: In the Matter of Responsibility of The Federal Communications Commission to Consider Biological Effects of Radio frequency Radiation when Authorizing the Use of Radiofrequency Devices, Second Report and Order F.C.C. 87-63 (released April 9, 1987).

134

47 C.F.R. Part 17

tion permit¹³⁵. The F.A.A. regulates obstruction marking and lighting to enhance the day and night visibility of antenna towers.

The Federal Communications Commission does not regulate the structural adequacy (from an engineering standpoint) of antenna structures, nor does it involve itself in the construction process per se.

(vii) Aesthetics

The F.C.C. does not directly regulate the appearance of a structure or the aesthetic state of the antenna site. The Commission's environmental impact process will involve an assessment of the visual impact of antenna proposals in a few limited circumstances.

(viii) Express Preemption of Local Regulation of Antennae

In two instances the F.C.C. has recently expressly preempted, to a limited extent, local ordinances affecting radio antennae and their support structures. The first, Memorandum Opinion and Order in PRB-1136 preempts all local ordinances which effectively

135

The F.A.A. cannot revoke or deny a construction permit for a radiocommunication tower but it can designate the proposal as an aviation hazard if it is constructed. This designation undoubtedly would make it almost impossible to insure the structure. Such action by the F.A.A. is not necessary as the F.C.C. has the power to take "further appropriate action" (47 C.F.R. 17.4(e)) if the proposal does constitute a hazard. This may mean restricting the height of a proposal or denying it altogether.

136

In the Matter of Federal Preemption of State and Local Regulations Pertaining to Amateur Radio Facilities, F.C.C. 85-506, 36149 (released September 19, 1985.) Some local ordinances relating generally to ancillary structures were also being used to regulate the height of amateur antennae and towers. These "structure" by-laws often limited the height of the antenna to about 30 feet. Such heights would effectively preclude communication at some of the frequencies assigned to amateurs and bring these antennae down to the level of off-air TV antennae greatly increasing television interference (TVI).

prohibit or significantly inhibit amateur (ham) radiocommunications. Amateurs in the U.S.A., through the American Radio Relay League requested federal protection from such things as overly restrictive height limitations, unreasonably expensive application fees and expensive and time consuming zoning variance procedures. This preemption was applied in a recent judicial decision¹³⁷ and substantial costs were awarded against municipality which acted in defiance of the new preemptive statement.

The second preemptive statement involved local regulation of Television Receive Only (TVRO) satellite dishes which citizens were attempting to erect on their property¹³⁸. According to this statement, an ordinance which unreasonably limits or prevents signal reception is preempted and of no effect if satellite dish antennae are being singled out in a discriminatory manner. Therefore, municipalities may not create location, height, diameter or shape rules which effectively preclude or restrict the siting of and reception to these antennae.

137 Thernes v. City of Lakeside Park, 779, Fed. 2d 1187 (1987) (U.S.C.A.), 6th circuit), 62 Radio Reg. 2d 286 (U.S. Dist. Ct. February 24, 1987). In the end, the amateur was permitted a 65 foot tower and eight additional feet for the mast and antenna.

138 In the Matter of Preemption of Local Zoning or Other Regulation of Receive - Only Satellite Earth Stations, F.C.C. 86-28 (adopted January 14, 1986). It should be noted that the F.C.C. issued an earlier preemptive statement regarding state or local regulations of Satellite Master Antenna Systems (SMATV) but it did not preclude zoning, public safety or health ordinances See: Federal Communications Commission, Memorandum Opinion, Declaratory Ruling and Order, CST-2347, F.C.C. 83-526 (adopted November 17, 1983).

(b) The Powers of Municipal Governments

In the United States the authorization processes employed by municipalities to regulate antenna systems differ little from those used to control the health, safety and aesthetic features of buildings and other structures located within their boundaries. Those who wish to construct or erect an antenna must apply for a building permit and the structure is regulated in accordance with existing ordinances. If the antenna is not expressly permitted in the desired area, an application for variance can be processed. This may involve an application fee, public notice and a public hearing.

While few municipalities currently regulate antennae in a comprehensive manner, ordinances concerning the following aspects of their siting, safety and aesthetics do exist and appear to be constitutionally valid.

(i) Location of Antennae and their Support Structures

Municipal ordinances can and do regulate the siting of antennae and towers within their jurisdiction.

(1) antenna moratoriums - it would appear to be legally permissible for local governments to enforce a temporary moratorium on antenna installations as long as the ruling is legitimately created to achieve a health or safety objective¹³⁹. Long-term or permanent prohibitions likely are unconstitutional or too restrictive of competition to withstand legal challenge under anti-trust law.

(2) zoning control - local governments may zone for antennae and their structures. In other words, commercial antennae may be

139

B. Bookin and L. Epstein, Regulating Radio and TV Towers, Planning Advisory Service Report Number 384, American Planning Association, (Washington, D.C.: 1984) (at p.14). The moratorium must be narrow in scope and reasonable in duration.

prohibited in residential areas. Also, antennae farms can be created and land dedicated exclusively to that use. In both cases, the municipality must consider applications for variance if an applicant wishes to locate in an area where the antenna would not conform to zoned uses, but, if the local administration does not wish to vary the ordinance and the antenna can be accommodated elsewhere the requested siting can be denied. As previously stated, the F.C.C. may preempt the zoning ordinances for any particular applicant, but such action would require such strong and compelling national interest¹⁴⁰ that it is never or almost never done.

(3) co-location of antennae - a few ordinances have gone far to force the use of antenna farms; to require applicants to locate new antennae on existing support structures and cause applicants for new towers to construct structures which exceed their own requirements (so that other antennae of future applicants can be reasonably accommodated. Such regulation appears to be valid so long as exceptions to the rules will be granted when technical problems will not reasonably permit such co-location.

(4) set back - the actual placement of the antenna or support structure on the site is fully within the control of the municipal government as long as the radiocommunication functions of the station are not unreasonably impaired or prevented. When such is the case, set back ordinances usually permit alternate siting arrangements on an individual case basis.¹⁴¹

140 A question of sufficient national interest may be present when the district government denies a construction permit for an antenna to a foreign embassy in Washington, D.C. Just such a controversy was ongoing in May of this year.

141 Therefore, if for example a private satellite dish cannot be placed in the back or side yards special permission may be granted to sites in the front yard, but its exact location may be dictated by a municipal planner and screening may be required to partially

(ii) Height of Antenna and Support Structures

Local administrations in the United States may control the height of radio antennae so long as they do not restrict the height beyond that expressly authorized by the F.C.C. As previously stated, the F.C.C. authorizes the minimum height necessary for the radio service to function properly. If the federal regulation does not expressly stipulate a height, (i.e. satellite dishes and amateur installations), the local restrictions should not impair the operative capacity of the station.¹⁴²

(iii) Safety Regulations

Local regulation of the safety of radio antennae and their support structures is extensive. The principal areas of activity are as set out below:

(1) R.F. energy exposure limits - the exposure of citizens or workers to electromagnetic energy is a matter which can be regulated by federal government and by both local or state governments. While local rules cannot authorize exposures which are prohibited by the F.C.C. they can and do set exposure limits which are more restrictive or stringent than those of the federal government.¹⁴³

block its visibility from the street.

142 While height limitations are not usually a problem for satellite dishes, the issue of the minimum antenna height necessary for an amateur station raises much controversy. The preemptive statement PRB-1 did not stipulate a minimum height. The American amateur radio community generally is of the view that their antennae must reach at least to 65 feet above the average terrain surrounding the station to achieve adequate short and distant communication and make use of the radio spectrum allocated for their use.

143 For example, the Portland Planning Commission has set an exposure limit which permits approximately one tenth the exposure of the Federal standard ANSI STD C95.1-1982. As mentioned in fn.133 such

(2) structural adequacy - the construction of new radio antenna support structures or towers is almost exclusively under the control of local and state governments. The structure design, building materials and engineering standards are within the control of the local government where the structure is to be erected.¹⁴⁴ When additional loading is to be added to an existing structure, be it a communication tower or a building, it is the local administration again which is in control.

(3) construction safety - municipal governments in co-operation with state administrations are responsible for such things as work site safety, electrical connections¹⁴⁵ and the inspections necessary to ensure that all engineering requirements and work safety rules are observed.

(4) site security - in addition to requirements set by the federal government to avoid exposure of workers or the public to certain levels of RF radiation, local governments often request such things as fencing, sign posting, intruder alarm systems and anti-climb devices (for the tower) be added to the proposal.

regulation has the National Association of Broadcasters very concerned. The F.C.C. in cooperation with the E.P.A. has recently completed a field study of a situation where the radiation recorded exceeded municipal levels but was within the federal limited. See: An Investigation of Radiofrequency Radiation Levels on Healy Heights, Portland, Oregon, July 28 - August 1, 1986, Electromagnetic Branch, Office of Radiation Programs, U.S. Environmental Protection Agency, Nevada 1987.

144 Sometimes engineering standards are dictated to the municipality by the state government.

145 When large antennae are constructed municipalities will incorporate standards from the state or national electrical code for connection, grounding and fire equipment requirements.

(5) site size - when tall antennae are constructed, local administrations often dictate the minimum dimensions of the site size so that falling ice or debris from the tower will not land upon surrounding structures. Site size requirements should not be used in a means to exclude certain antennae from residential areas (i.e. amateur and off-air TV towers).

(iv) Aesthetics

As long as an aesthetic treatment does not impair radiocommunications, and is not unreasonably demanding or expensive in relation to the value of the particular radio installation involved, a municipality can require the following action.

(1) design of support structure - not only can a local government dictate the engineering standards and design of a support structure, it can select one type of structure over another based upon visual impact features.¹⁴⁶ Particular construction materials can be required on the same basis.

(2) colour of antenna or support structure - local administrations can require that certain antennae and their support structures be painted colours which make them more visually unobtrusive or aesthetically pleasing.¹⁴⁷ Of course, painting and marking requirements could not conflict with F.A.A. obstruction marking

146 For example, a guyed tower may be selected over a free-standing one because it is far less obtrusive when seen at a distance.

147 It is not unusual for tall cellular antenna towers near Washington, D.C. to be painted sky blue. For parabolic dish antennae, paint which is lead free will not affect their performance.

when such is required. A municipality may also forbid certain painting if used to create a billboard effect.¹⁴⁸

(3) screening/landscaping - this is an aesthetic treatment which is often demanded by local ordinances for certain antenna installations when such are located very proximately to residential population. Parabolic dishes are frequently screened by requiring fencing, vegetation, earthen berms or roof-line architecture to lessen their visibility. Again, such requirements should be reasonable and should not interfere with the operation of the device. It is not unusual for broadcasting antenna installations to be screened at their base by evergreen planting. Also, requirements that an antenna site be maintained on a regular basis may be included as a condition of land use authorization.

(4) siting requirements - one of the most common requirements for small antennae, especially those in residential areas, is that they be sited, relative to existing structures on the land, to minimize their visibility from the street. Many TVRO dish ordinances require that these antennae be installed in the back yard or relative to the roof line of the rear of the principal structure. Amateur antennae are frequently relegated to rear yards for the same reason. In either case, alternate siting arrangements must be available if obstructions at the site significantly impede radiocommunication.

(v) Other Regulations

Local governments, in addition to the controls and objectives already discussed, can regulate such things as on-site parking and roads for access and egress at the site. In some cases, municipalities may require a radio licensee to carry a reasonable

148

Frequently, parabolic dish antennae display advertising.

amount of liability insurance in case the antenna, or part of it, falls and damages surrounding structures.

Conclusion

It is readily apparent that pursuant to their jurisdiction to make and enforce ordinances and regulations which relate to the health, safety and aesthetics of buildings and structures within their boundaries, local administrations in the United States regulate many aspects of antenna installation and operation and of their support structures. While this activity may delay somewhat an antenna installation and, at times, significantly add to the costs involved, the federal government's power to manage the radio frequency spectrum is not unreasonably impeded or interfered with. By means of such local regulation, the noxious or undesirable aspects of radio antennae are minimized where such is reasonably possible, yet radiocommunications can be fostered and developed in the public interest.

V. GUIDANCE FOR MUNICIPAL BY-LAWS

The constitutional law material provided in this study confirms that the general legal principle, enunciated by the Department of Justice for Canada over ten years ago, is the law of Canada today. That principle is that provincial, hence municipal, governments do not have lawful jurisdiction to create enforceable rules which relate directly to radiocommunication, but a properly framed by-law relating only incidentally to radiocommunications, may co-exist with federal legislation provided such by-laws do not prohibit nor unduly restrict the conduct of radio services or the operation of federally-licensed radio stations.

Following a review of: the federal legislation affecting radiocommunications; the policy created at the federal level pursuant to those legislative provisions; many of the historical, practical and technical issues involved; and the constitutional jurisdiction of the federal government over radiocommunications; the following general principles are offered regarding current law:

(May not regulate)

- (1) municipalities have no lawful jurisdiction to manage the use of the radio spectrum. Therefore, provincial governments may not delegate power to manage any aspect of the nature or sources of radio interference experienced within municipal boundaries. To the extent that by-laws contain interference rules, they are of no force or effect.
- (2) despite the issues of local safety involved, municipal by-laws may not lawfully set or police limits on the nature or duration of worker or citizen exposure to radio frequency energy. Provincial occupational health and safety legislation must defer also to federal authority.
- (3) local ordinances, whether general land use prohibitions (zoning) or specific ordinances attempting to deal with radio antennae or towers, are ineffectual to the extent that they propose to prohibit the siting of either a licensed or unlicensed antenna. Nor may they require that antenna be co-located on an antenna farm or other manner.

- (4) municipal rules may not expressly control or limit the type or height of an antenna system or support structure, for aesthetic or any other purposes.¹⁴⁹
- (5) local administrations, through either municipal or provincial building codes or any other means currently available, have no lawful jurisdiction over the structural integrity or adequacy of an antenna or its support structure.

(May regulate)

- (1) local governments have full control over land in which legal title is vested with the corporation of the municipality. Controls over the health, safety or aesthetics of radio antennae sited on such land would lawfully be regarded as private controls on land if contained within private leases. Municipalities may designate such lands as antenna farms, refuse to approve building permits for any other structures lawfully within their jurisdiction and control access to the site by such leases. The provisions of such leases could offer preferred interference protection to municipal services sited at that location and control any other aspect of antenna regulation denied to items in (1) to (5) above. The municipality could not create private rules which caused itself or its lessees to breach federal spectrum management policy or federal aeronautical obstruction regulation. Local governments could not adopt by-laws or other rules which have the effect of forcing or coercing radio stations to locate within the designated area as opposed to some private site.
- (2) when an antenna or antenna support structure is to be affixed to or mounted upon a building or structure, which is subject to municipal land use control, a local building permit must be secured in advance of construction or affixation. To the extent that such is reasonable and necessary, the municipality may set load, stress, electrical connection and grounding requirements (for lightning stroke only) as such may relate to the existing structure. Such requirements should not be used as a means of preventing or discouraging the particular choice of site.

149 An exception to this rule would be municipal height restrictions used to refine the siting of parabolic satellite dishes. [See: general principle number 5 in the 'May regulate' section] The reason for this exception is that these antennae require only an unobstructed "look at" the satellite(s) from which they are receiving signals. Therefore, height per se is not related to operative capacity. In fact, in some cases dishes work best when they are low to the ground or sited below the height of average surrounding terrain to avoid terrestrial interference.

- (3) if an antenna supporting structure is to be used for some purpose in addition to the raising and securing of radio antennae, or if structures for a purpose ancillary to a radio station are to be co-sited with the antennae, a municipality has zoning and building permit control over the health, safety and aesthetics of the structures as such do not relate to the operational capacity of the radio system. Stated simply, when structural features are incorporated into, or added onto, or co-sited with an antenna and support structure, which are not a natural and necessary part of the antenna installation (ie. production studios, scenic look-offs and restaurants, offices, warehouse structures, etc.), those features are subject to local regulation irrespective of the radio station. If such features would be contrary to existing municipal planning, permission to add them can be denied.
- (4) subject to federal regulation which may be created in the future, safety issues such as electrical power interconnection, grounding (lightning stroke), fire fighting and prevention equipment (ie. cooling apparatus), crane permits and work site occupational health and safety (unrelated to RF exposure) may be regulated through provincial authority and provincial and local building codes. Following construction, the security at the site (ie. fences, intruder systems (if unmanned) and anti-climb devices, can be required locally, so long as such requirements are reasonable in relation to the cost of the installation. If an antenna is proximate enough for an antenna fall, or falling ice or other debris, to cause property damage to neighbouring land holders, third party liability insurance, commensurate to the risk realistically posed, may be required.
- (5) when an antenna (and support structure) is to be sited within, or immediately adjacent to, an area where a strong and compelling local interests exists in the aesthetic character of the area (ie. residential, heritage or developed recreational area), a local government may require reasonable accommodations to the siting, painting or screening of the antenna and support structure. Such can be required so long as the operative capacity of the radio device is not restricted or impaired and the cost is not unreasonable considering the cost of the installation. Therefore, the orientation of an antenna on its site can be controlled to minimize its visual impact, antennae and support structures can be painted to blend with their background and natural and man-made screening can be used to screen a view from a particular perspective. Additionally, local rules could control the display of advertisements using satellite dishes, or other antennae or support structures. Of course, municipal aesthetic treatment may not conflict with federal aviation obstruction marking or lighting.

VI. CONCLUSION

This study has attempted to identify the technical, policy, practical and legal problems associated with the establishment, and to some extent, the operation of radio antennae within Canadian municipalities. Guidelines, which try to bring some precision to the issue of the extent of the constitutional jurisdiction currently vested in municipalities to respond to these problems, are presented in the previous section of this paper. The creation of this guidance was complicated by the fact that no legal cases have been decided which go beyond the elementary issues of jurisdictional control over radio apparatus and over the establishment of radio stations. Also, most of the legal precedent concerns only broadcasting undertakings. As a consequence, the guidelines are a product of the blending of the technical, political and practical factors which appear to be relevant, as structured within the context of general constitutional principles and trends, and decided legal cases.

It is submitted that the guidelines do identify and, if applied, will protect the legitimate interests of the federal government and of municipal administrations in Canada, except in the following respects. The current constitutional powers of municipalities do not permit them to deny the choice of site for a radio transmitter and antenna. Nor do they permit local governments to require accommodations to the height, dimensions or structural integrity of antennae or support structures selected for a particular installation. Clearly, such powers would encroach upon the federal government's exclusive jurisdiction over radiocommunications.

This lack of municipal jurisdiction is significant because, while the number of such has remained few,¹⁵⁰ there have been cases in recent Canadian

150 It is interesting to speculate about why the number of cases where municipalities strongly oppose the establishment or the height or dimensions of particular radio installations is quite low. To their credit, most applicants for radio licences and certificates are quite sensitive to the impact their installation will have

history where the applicant for a radio authorization selected a site, a support structure or antenna system which was clearly inappropriate relative to the nature or character of the area where the antenna was to be located. For example, commercial antennae and towers have been sited next to residential homes, agricultural land of national, economic and heritage importance has been selected for elaborate antenna proposals and satellite TVRO dishes have been mounted atop the uppermost parts of residential roofs.

According to the constitutional law of Canada, local or provincial governments cannot deny such sitings and pursuant to rules of legislative interpretation, the federal government cannot deny the radio authorization under the existing Radio Act or the Aeronautics Act (unless there exists a genuine spectrum management or aeronautic navigation problem). Therefore, when serious land utilization issues arise, no mechanism exists to consider them. Yet, due to the radiocommunication jurisdiction of the federal government, accommodations of this nature are within the exclusive constitutional competence of the federal government even if the Radio Act currently does not provide the legislative authority to do so.

Considering the low frequency of serious land utilization controversies which historically have arisen, the federal government may wish to inform municipalities of the full extent of their constitutional jurisdiction and take no other action. This is not recommended as there is substantial evidence that Canadian municipalities and their residents are becoming increasingly sensitized to this particular land utilization issue and that the frequency and strength of local objections is on the rise.

upon the area where it is to be located. Obviously, radio operators who wish to provide a broadcasting or a commercial service must be careful about the ill will they may cause. On occasion, radio authorization personnel of the Department of Communications have convinced applicants of the wisdom of accommodating local desires. A certain amount of tolerance may be related to the role Canadian municipalities and citizen groups have historically played to encourage the establishment of additional and improved radio and television broadcasting transmission and cable facilities.

If the federal government elects to integrate land utilization and radiocommunication issues the following policy implementation issues must be considered: Which land use and environmental policies are to be applied? Will the policies have a national or particularly local perspective? When radiocommunication and land utilization objectives are in conflict, which are to prevail? Should the locus of decision-making for such issues be at the local, provincial or federal level? If such is to take place at the federal level, should it be performed by the Department of Communications, the C.R.T.C.,¹⁵¹ Environment Canada or some new antenna tribunal?

It is obvious that selecting the best course of action is not a simple task. Hopefully, this study will contribute, in a positive way, to the resolution of this growing land utilization problem.

¹⁵¹ The CRTC could be selected to decide disputes involving all types of radio antennae or only those related to broadcasting undertakings.

