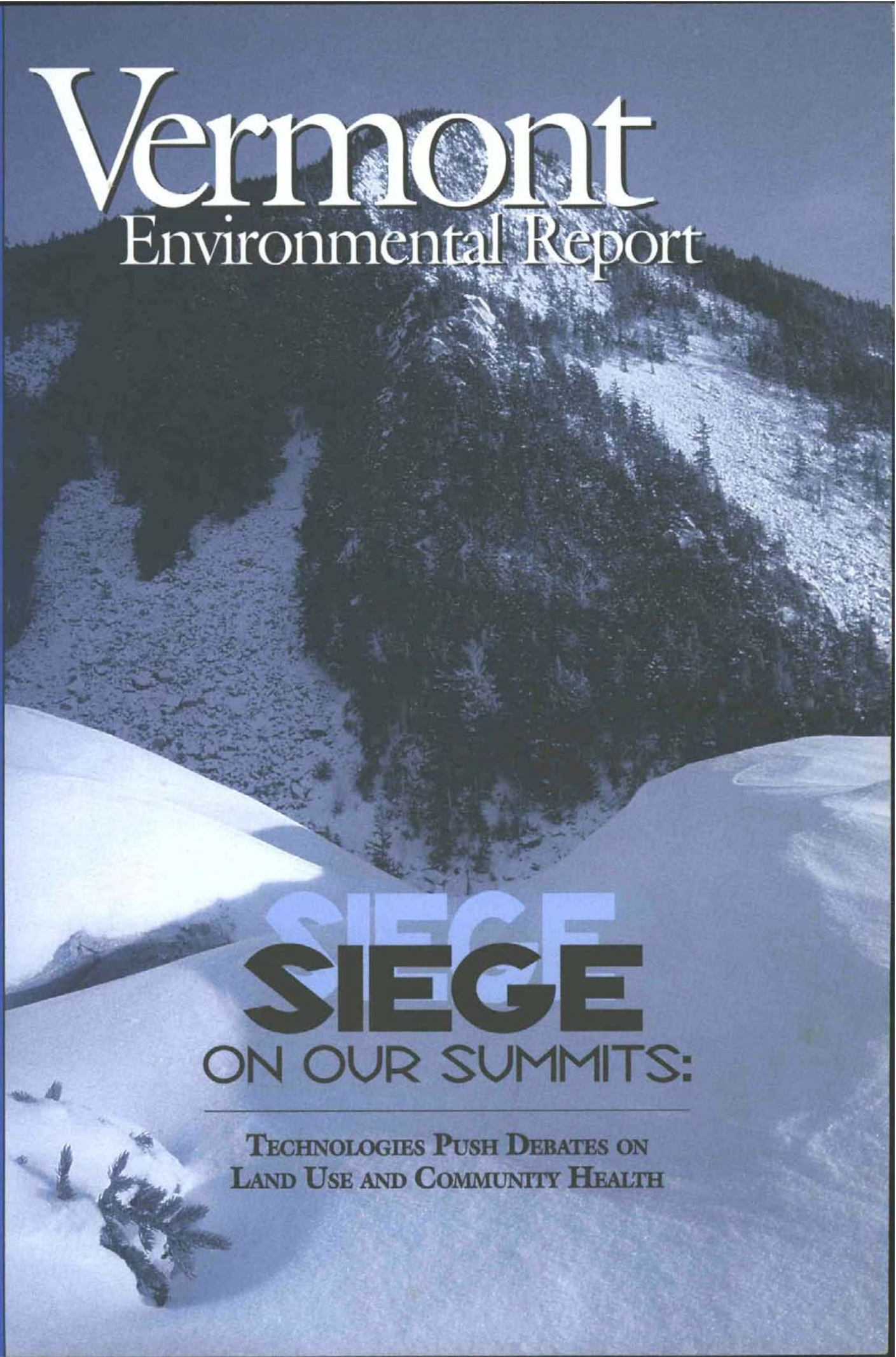
VNRC

# Vermont Environmental Report

Published by the Vermont Natural Resources Council, Inc.



## SIEGE ON OUR SUMMITS:

### Technologies Push Debates on Land Use and Community Health

March 1997

The Vermont Community Foundation contributed to this publication.

The Vermont Natural Resources Council, Inc., is a nonprofit environmental organization founded in 1963 to protect Vermont's natural resources and environment for present and future generations through research, education, and advocacy.

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***Credits:*** *Cover photograph: White Rocks National Recreational Area by A. Blake Gardner; Pages 4, 5, and 7: Killington site photographs by Jay Maciejowski; Page 8: Berlin Tower photograph by Will Lindner; Page 9: Ascutney site photograph by Jay Maciejowski; Page 12: The Times Argus; Pages 14 and 15: Pease Mountain site and Fournier photographs by Will Lindner; Page 16: photograph by Steven D. Faccio; Page 18: Groton State Forest photograph by Vermont Travel Division; Page 19: Camel's Hump State Forest photograph by A. Blake Gardner; Pages 22 and 23: photographs by Sue Higby; Page 22, bottom: photograph by Jim Shallow; Page 25: Mollie in the Kodiak National Wildlife Refuge, Alaska, photograph by Walter Stieglitz; Page 26: Josephine Albright photograph by Rick Russell; Page 26: photographs by Sue Higby; Back Cover: Photograph by Jim Shallow.*

# MORE THAN INTERESTING

*STEPHEN J. HOLMES, ACTING EXECUTIVE DIRECTOR*

After experiencing first-hand the harsh reality of Tibet during her student sojourn there two years ago, my daughter might not care for my use of a Chinese proverb under any circumstance. Her not-so-subtle persuasion has led to "Free Tibet" stickers on our cars and avoidance of the "Made in China" label (Do you have any idea how difficult the latter is?).

But the saying that translates roughly to, "May you live during interesting times," seems appropriate to describe my feelings as Acting Executive Director since last July. Interesting times indeed! In the space of just eight months, it has been my good fortune to witness some of VNRC's most important successes: The precedent-setting explosion removing the Clyde River #11 dam and restoring the waters for salmon spawning; the landmark Water Resources Board decision on the Lamoille River which set the stage for restoring rivers throughout Vermont; and the Vermont Senate's vote to halt herbicide spraying in our forests.

*Interesting times indeed! In the space of just eight months, it has been my good fortune to witness some of VNRC's most important successes.*

And in the last week of February, with the deceptively simple stroke of a pen, VNRC has helped preserve forever almost sixteen thousand acres of near wilderness surrounding the Somerset Reservoir and other headwaters of the Deerfield River, through an agreement with the State and New England Power Company settling the Deerfield River hydroelectric power case.

All this *and* the February 5th Vermont Supreme Court decision ruling Vermont's system for funding education unconstitutional. All of a sudden property tax reform is within reach. And who would have dreamed that education finance reform, a fix for current use, a statewide property tax, *and* the elimination of intercommunity competition for new development (the missing piece of the land use planning puzzle) were all possible this year? Very interesting times!

As we approach the next millennium ("2K" or bust), have you noticed how things and people change, even in Vermont, at a faster and faster pace. Consider the new technologies (and new human behavior patterns) that have emerged in just the last decade or so. Worldwide Internet use jumped from three million to sixty million on-line in the past year. Between 1984, the dawn of the cellular phone industry, and 1995, the number of cell sites in the U.S. grew from 346 to over 19,000, and that number is expected to top 115,000 in a few years. Vermont may need as many as 200 sites to blanket the state with cell-phone coverage.

Vermonters' increasing desire to communicate by car phone is but one facet of a growing public policy debate over how to site the various telecommunications facilities for radio, television, and other uses we see springing up on our mountains.

In this issue of the *Vermont Environmental Report*, Will Lindner helps us draw a bead on the complexities of this debate. His feature story, "Drowning in the Airwaves," focuses on the nature and extent of the telecommunications revolution, including how public health concerns are addressed, how the industry is regulated, and to what level public interest is protected.

Companion stories explore the Town of Charlotte's ongoing struggle over the WIZN radio tower; the implications of development at high elevations on wildlife like the Bicknell's Thrush; and aesthetic impacts of towers and facilities.

*P.S. I hope you will read Jim Wilkinson's memoir for Mollie Beattie. The sadness surrounding the loss of our friend and colleague has given way to hope that the things she cared about so deeply will be carried on through the newly created Mollie Beattie Policy Internship. I want to personally thank Jane Difley, Karen Meyer, Beth Humpstone, and Rick Schwolsky for their support and advice, and the Vermont Community Foundation for helping make it possible.*

VNRC

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# Drowning in the Air Waves

## Vermont Confronts Tower Technology

It was midway through the first presentation of the morning—Dr. Keith Florig's discourse, titled *A Primer on Electromagnetic Fields and Non-Ionizing Radiation*—when the delicate, warbling sound touched the air. There were no windows in the spacious Killington conference room to permit sounds from the outdoors, but even if there had been, this was no songbird's call. It was mid-November, and Vermont's last migratory birds had yielded to the first stylish skiers from downcountry.

No, this was a different sound altogether—a mimic of nature, and a sound that, while not unpleasant, was ironic in this setting. The Vermont Law School's conference, *Unplugged: Health and Policy Implications of the Wireless Revolution*, had barely begun when somewhere in the

*Clearly, the cell-phone has arrived. Congress and the Vermont Legislature both passed laws in 1996 to encourage the wireless communications industry, metaphorically watering the mountaintops where new facilities will sprout.*

audience someone's cellular phone went off. It was followed soon by another, and then a third cell-phone signal. On the perimeter of the audience, all through the two-day conference people could occasionally be seen huddled against the walls for privacy, holding the portable, pocket-sized telephones to their ears, the slender antennas extended alongside their heads to catch the invisible signals.

Much of the conference time was devoted to the question of whether radiofrequency radiation, the energy waves that carry the signals for cellular phones, endanger the health of their users. And here were the conferees, many of them, keeping tabs on their responsibilities elsewhere by means of the same apparatuses.

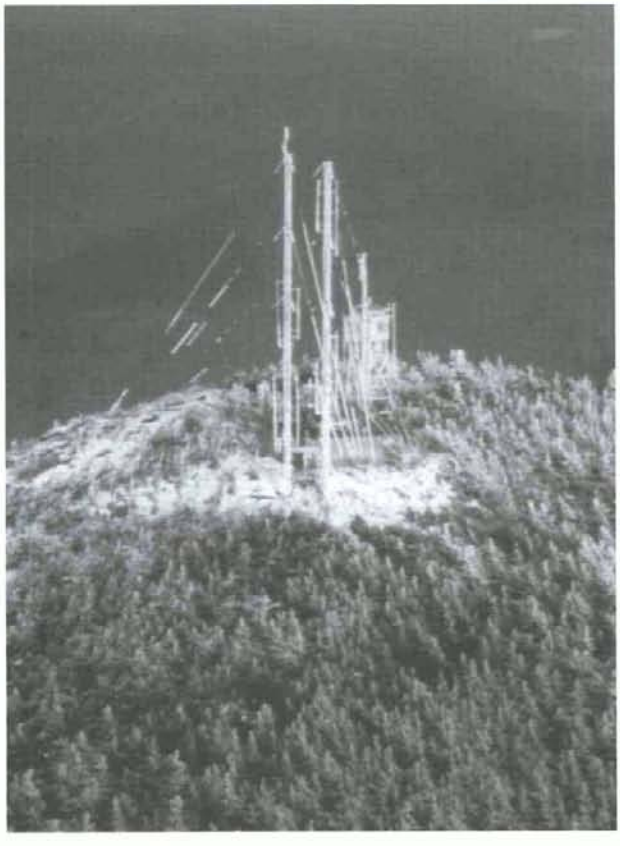
Clearly, the cell-phone has arrived. And there will be no cramming this genie back into its bottle. The U.S. Congress and the Vermont Legislature both passed laws in 1996 to further encourage the wireless communications industry, metaphorically watering the mountaintops where new towers for microwave transmitting and receiving facilities will sprout.

In fact, some Vermont senators last year had overreached themselves, seeking to provide nearly carte blanche for communications companies to set up their towers with diminished opportunity for residents to challenge them. Even in a state tethered to the interests of tourists—which includes their expectation of up-to-date links to their homes and offices far away—that was too much. The Senate bill died in the House, VNRC helping see to its demise.

These Vermont actions were mere skirmishes in a growing regulatory war with fronts all over the United States. For when it comes to the broadcast and telecommunications industries, Vermont isn't the "bad guy" that supporters of economic progress at any environmental price often make it out to be. Nor is Act 250 particularly a villain—no more so than the planning commissions and zoning boards that have been the forums in other states for citizens to make their concerns known about telecommunications towers and the cryptic science that surrounds them.

But such citizens have not fared well. That is because:

(1) Local governments are constrained in some respects under federal laws that bequeath authority to the Federal Communications Commission (FCC ); in other respects, local officials such as zoning board members may have more power than they realize, but to wield it effectively they'll need to develop means, for example, to test whether licensed facilities in their towns continue to operate in compliance with FCC standards;



(2) Industry giants like NYNEX, with seemingly limitless funds and political clout, are the major players in the burgeoning wireless communications industry; and

(3) Citizens challenging the industry are standing in the tide of technological progress. Unarguably, people want their cell-phones and pagers. The Cellular Telecommunications Industry Association (CTIA), tallying its expansion in 1995, claimed a 40-percent annual growth that had brought the total number of wireless customers in the United States to 33.8 million at the end of that year, with revenues of $19 billion. Citizens also want the other benefits of cellular technology, including access to 911 services from their cars and the best communications possible for police, ambulance, and rescue squads. And they want the entertainment choices offered by the newest TV and radio systems.

Yet, as scientists, advocates, and attorneys pointed out at the Killington conference, technology, driven more often than not by financial opportunism, often outpaces our understanding. We know enough science to get us our inventions, but not enough to know, until too late, what we have wrought. It's an old story, perhaps

*We know enough science to get us our inventions, but not enough to know, until too late, what we have wrought.*

to be told again in the proliferation of technologies that, as author Blake Levitt said, have "altered the electric field of the world without [our] knowing the consequences."

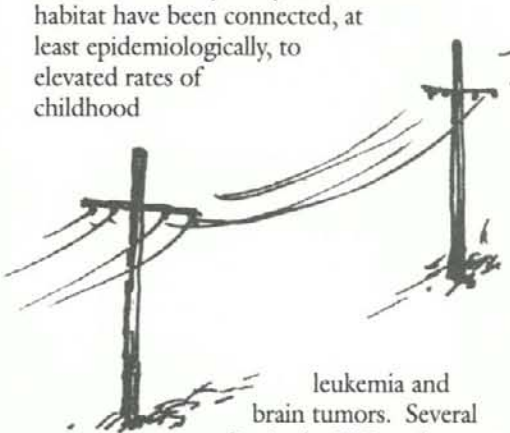
But we will know the consequences in time, for as Dr. Paul Heroux, a research scientist from Quebec, pointed out, a body of evidence is accumulating day by day.

"In the future, you will all be using . . . cellular phones," he told his audience, "and that may solve the research problem."

"Oh, I see," said VNRC's Acting Executive Director Steve Holmes, nudging his neighbor in the audience. "The bodies of evidence will be us."

## The Great Power Line Debate

For years, the greatest public health concern in this realm has centered on the electromagnetic fields (EMFs) created by electric power lines. The live wires that extend into nearly every corner of human habitat have been connected, at least epidemiologically, to elevated rates of childhood leukemia and brain tumors. Several studies in the U.S. and Europe have identified an occurrence of leukemia in children who live near complexes of power lines that is one and one-half to three times higher than in children farther removed from the overhead pulse of electricity.

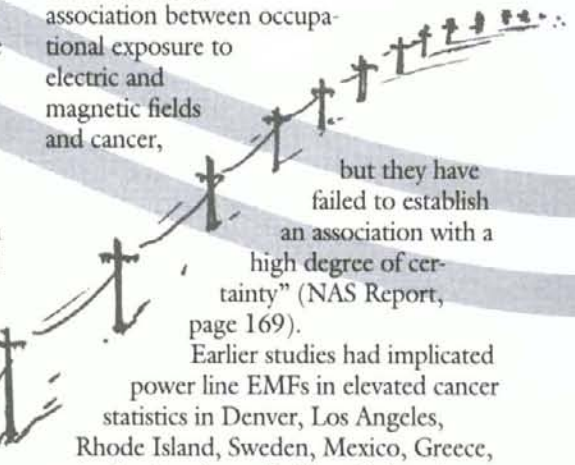


But the numbers and the science don't appear to match up. The high-tension lines are, in fact, within the extremely low frequency (ELF) range of zero to 3,000 Hertz (Hz). By contrast, the frequency of FM radio transmissions is in the vicinity of 100 megahertz (MHz, "mega" meaning million), microwave ovens produce an energy field at frequencies in excess of one gigahertz (GHz, or "billion") to excite the molecules in food and make it hot. It is high frequency energy waves—and in particular the "ionized" ranges used in X-rays and radiation therapy—that alter matter, including human tissue. In the U.S., power lines operate at 60 Hz. If you pick up a downed transmission wire, you'll get electrocuted, not irradiated.

Efforts to ascertain whether power line EMFs pose a danger have produced no absolute verdict—although the latest such study, published in October by the National Academy of Sciences (NAS), makes some claim to doing so. The NAS committee reviewed 500 EMF studies performed over 17 years and came down on the side of absolving power lines. The news media ran with the committee's majority report: "Panel Sees No Proof of Health Hazards from Power Lines," trumpeted *The New York Times*; "Study Clears Magnetic Fields as Cancer Cause," echoed *The Rutland Herald*.

But like a Supreme Court decision, there were dissenters among the panelists. Statements found in the bowels of the report were far more equivocal.

"Overall, the data from published studies (of residential magnetic field exposure and cancer) support an argument for an increased risk with higher exposure levels; however, the anomaly between measured magnetic fields and wire codes in different cities severely weakens this interpretation" (NAS Report, page 163); and "(T)he most recent studies have increased rather than diminished the likelihood of an association between occupational exposure to electric and magnetic fields and cancer, but they have failed to establish an association with a high degree of certainty" (NAS Report, page 169).



Earlier studies had implicated power line EMFs in elevated cancer statistics in Denver, Los Angeles, Rhode Island, Sweden, Mexico, Greece, and other locations. In New York and Connecticut, too, they were thought to be complicit in cancers afflicting children and adults employed by electric utilities. The NAS could not explain away the higher statistics found in a dozen or so studies of the issue.

To the extent the connection applies, it is transmission lines rather than the lower-power distribution lines that concern public health advocates. Vermont's population is small and relatively scattered, so there are fewer high-kilovolt (kV) transmission lines running through our state.

The most powerful lines, 450 kV, traverse 52 miles of the Northeast Kingdom, delivering Hydro Quebec power to Vermont and to the cities of southern New England. From Norton through Lewis, Bloomfield, Brunswick, Ferdinand, and Granby on south to Waterford, the lines travel through some of Vermont's most sparsely populated towns. According to Ed Congdon of the Vermont Electric Company, Vermont's main transmission entity that is owned in partnership by most of the state's electric utilities, the lines travel almost exclusively through rights-of-way blazed through forest lands owned by the paper companies that dominate land ownership in the Kingdom. Congdon said the 450 kV lines miss villages and settled areas altogether.

The next most powerful transmission lines are in the southern counties. They

*All this growth is taking place in an industry virtually unregulated by the state.*

carry nuclear power produced at the Vermont Yankee plant in Vernon northward to Brattleboro, then continue on to Cavendish before turning westward and extending to Rutland. Except for the population centers at each end of this 79-mile length, these 345 kV lines also traverse a fairly low-density region. Much more of Vermont, some 370 linear miles, is serviced by 115 kV transmission lines. More common still are the smaller 34.5 kV and 46 kV lines, which service substations that reduce the voltage further for transport via distribution lines to residences and businesses (where the current is reduced again to "service voltage"—120 to 240 volts—by the transformers you can see mounted on your roadside utility poles).

A reasonable conclusion, then, would be that if there is a health threat from power line EMFs, the dispersed residents of Vermont are relatively safe from it.

## 'Cell Division' in Vermont

No such asylum extends to radiofrequency radiation. Broadcast facilities blanket the state (AM and FM radio—plus television, where digital, high-definition technology will soon erupt in a demand for a whole new generation of transmission facilities). And microwave transmissions in Vermont are now the province of hospital emergency rooms, sheriffs' departments, and local rescue operations, as well as private paging services and point-to-point voice, video, and data transference related to business activities.

Most important, the cellular phone companies have Vermont squarely in their sights.

"The cellular telephone business is growing very fast here," says Commissioner Richard Sedano of Vermont's Department of Public Service. "Customers want this service."

Three companies are licensed to operate in the state. Atlantic Cellular (d/b/a Cellular One) serves all of Vermont, and Bell Atlantic NYNEX Mobile (BANM) serves all but the two southernmost counties, Bennington and Windham. US Cellular operates only in those counties.

"Atlantic Cellular says they have on the order of [40]sites at this point," says Sedano, "and they feel that will be more than half the sites they're eventually going to need. BANM has 15 to 20 sites, and they'll probably need about that many sites again."

An emerging technology called personal communications systems (PCS) will add even more towers to the Green Mountains. PCS is a digital, rather than analog, system and requires more transmitting facilities per

area served. Sprint, the long-distance telephone company, recently purchased at auction the higher-frequency PCS band widths for Vermont from the FCC. It plans to begin deploying its Vermont system in 1997.

(And what about the FCC auctioning band widths—which as natural phenomena would more appropriately seem to be the government's to oversee as a public trust, rather than a commodity to sell to commercial bidders? Suffice it to say that, according to the Washington, D.C.- based Resources for the Future, auctions of certain portions of the spectrum have brought the FCC $20 billion in revenues since 1993; that can buy a lot of deficit reduction.)

All this growth is taking place in an industry virtually unregulated by the state. The Public Service Board requires only a Certificate of Public Good, which addresses the benefits to Vermonters of the services to be rendered, not an accounting of the health and safety implications of a project.

And there are the municipal users. The Orange County Sheriff's Department owns a Rohn 45 tower that Sheriff Sam Frank has been trying for six years to have erected somewhere. Finally, construction has begun on Mt. Pleasant in Williamstown.

"Every time we thought we had a location, someone would put up a stink—a 'not in my backyard' type of thing," says the sheriff. "We could have taken land by eminent domain but we chose not to, both for financial and public relations reasons."

From a distance, says Frank, the 180-foot tower will look like a needle in the sky.

"In this terrain there are a lot of mountains, and radio communications for us is extremely bad," Frank explains. "That's why we need the tower. This is not a pleasure thing. It will help us for law enforcement, fire and ambulance, and rescue operations.

"Actually," Frank says, "I could use four towers for four locations, and even that wouldn't give us 100-percent coverage. That's just the way Vermont is. There are a lot of what we call dead spots. But we'll just do the best we can with what we've got."

With so many different entities now involved in wireless communications, it's hard to predict how many towers there eventually will be. Some people expect 200 more facilities in Vermont before the build-out is complete.

There is an interest in some quarters in reducing that number by requiring companies and municipal services to double

*"The process only works to the extent that the parties participate. A lot of the heavy hitters—regional planning commissions and state agencies—aren't even coming to the table. They're nonentities."*

— District Environmental Coordinator Ed Stanak

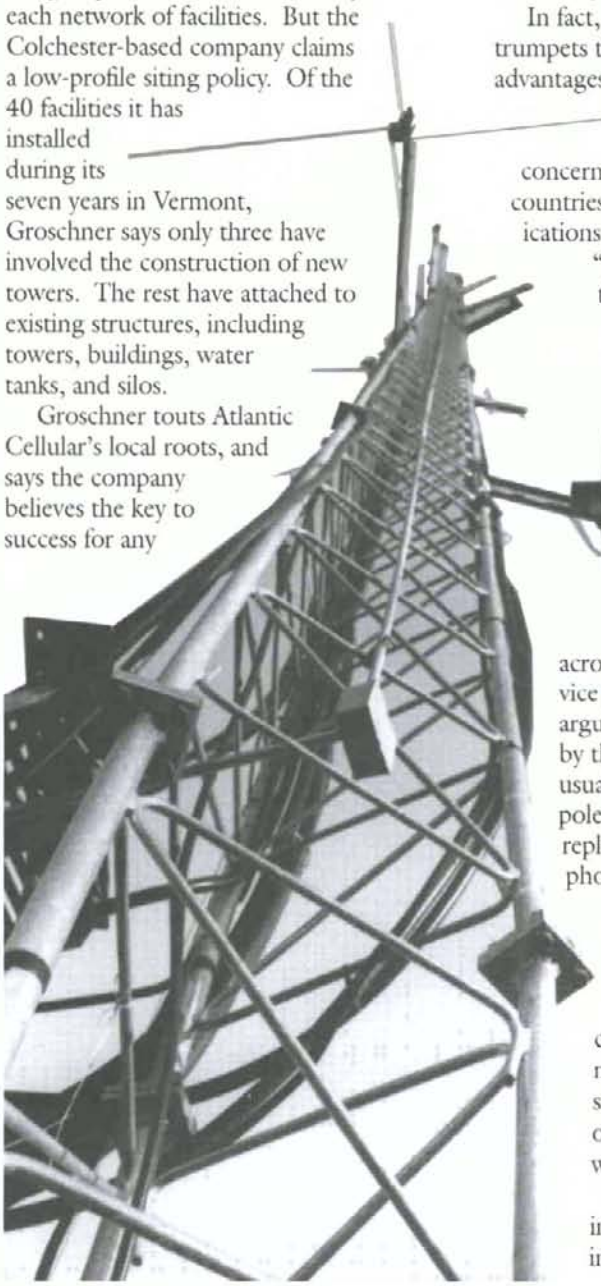
up on existing towers. Support for that view—in spirit if not in letter—is echoed by a surprising source.

No. . . . Atlantic Cellular emphatically does not favor a "co-location" requirement; the company's attorney and representative, Holly Ernst Groschner, says providers must have flexibility in siting to serve their "cells"—the small, geographically congruent groups of customers served by each network of facilities. But the Colchester-based company claims a low-profile siting policy. Of the 40 facilities it has installed during its seven years in Vermont, Groschner says only three have involved the construction of new towers. The rest have attached to existing structures, including towers, buildings, water tanks, and silos.

Groschner touts Atlantic Cellular's local roots, and says the company believes the key to success for any business in Vermont lies in limiting the impact of its activities on the environment—even though that can mean deploying a greater number of discretely-sited facilities in order to serve a cell. "When I drive to work, I would rather see more sites that are proportional to the Vermont landscape than great monoliths to human technology that distort the viewshed," she says.

In fact, the industry's trade association trumpets the purported environmental advantages of cellular technology. It claims that those advantages, as well as economic concerns, are motivating developing countries to skip land-based communications entirely.

"Wireless phones replace a system that requires millions of trees to be cut down for the poles, and tons of copper to be mined for wire. Most developing countries . . . are now going directly to wireless so they will not have to string thousands of miles of wire across their landscapes," writes CTIA vice president Tim Ayers. That argument, however, is undermined by the fact that telephone wires usually piggyback on electric utility poles, and that fiber optics are replacing traditional cable for many phone services.



## The Preemption Chess Game

Whatever its merits, co-location—that is, combining microwave equipment on the same structure, even when the owners are competitors—is not written into Vermont law.

In fact, very little is written into statute or regulation pertaining to microwave communications. The district commissions and the Environmental Board controlling Act 250 are feeling their way through a tangle of issues, and at least one district coordinator believes the commissions are being outgunned by the corporate interests promoting facility siting.

"The bigger law firms are way out in front, finding loopholes and coaching companies to thread the needle through the Act 250 process," says District 5 Coordinator Ed Stanak.

He points to a project on Mount Irish in Berlin, where Atlantic Cellular erected a 130-foot telecommunications tower (presumably, one of its three construction sites) on a parcel of land owned by Rinkers Communications, a local paging and answering service based in Barre. In 1980, Rinkers bought a tower erected at that location 25 years earlier by a company for radioing its truckers. Those were the early days of wireless communication, and Act 250 didn't exist then either. Projects were grandfathered into the act when it took effect in 1970.

Originally, Rinkers leased the land that held the tower. Later, in a complex series of events, Rinkers purchased 28 acres of the land, replaced the original tower, and leased space on it to Atlantic Cellular.

Then, two things happened: Atlantic decided to build its own tower on Mount Irish, and Rinkers sold off all but five acres of its property to a private couple, reducing its holdings to less than the 10 acres that trigger Act 250 review. The Environmental Board last May held that Rinkers' divestiture of land was not related to its later deal with Atlantic, and that the five-acre tract put the project below Act 250's threshold.

Stanak believes the board applied rules that pertain to municipal, not private, developments, and that the total of "involved land" for the Mount Irish site warranted the board's full consideration. (The term "involved land" refers to the sum of land that contributes to and makes a project viable; that is, not only the acreage upon which the development is situated, but, for example, easements for access

*And what of other public concerns, such as aesthetic objections to constructing ungainly, Erector-set towers festooned with disks and antennas, against a beautiful skyline? Companies can and do argue that they clash with Congress' goal of providing Americans unimpeded cellular access.*

roads, power lines, and other necessary infrastructure.)

"If the Rinkers decision holds up," he says, "it could serve other companies as a manual on how to get past Act 250."

But Stanak also believes the key to making Act 250 effective in these projects is getting the public sector involved.

"The process only works to the extent that the parties participate," he says. "A lot of the heavy hitters—regional planning commissions and state agencies—aren't even coming to the table. They're nonentities."

Parties that do come to the Act 250 table find considerable disagreement about the state's statutory or regulatory jurisdiction over microwave facilities. In a memorandum to the Environmental Board filed for the Rinker decision, Atlantic Cellular argued that Congress gave the FCC authority to regulate broadcast facilities in the 1934 Communications Act, and the FCC had since extended that authority to cellular service. The policy of the FCC is to facilitate seamless nationwide cellular service, Atlantic contended, and to that end FCC procedures preempt state law.

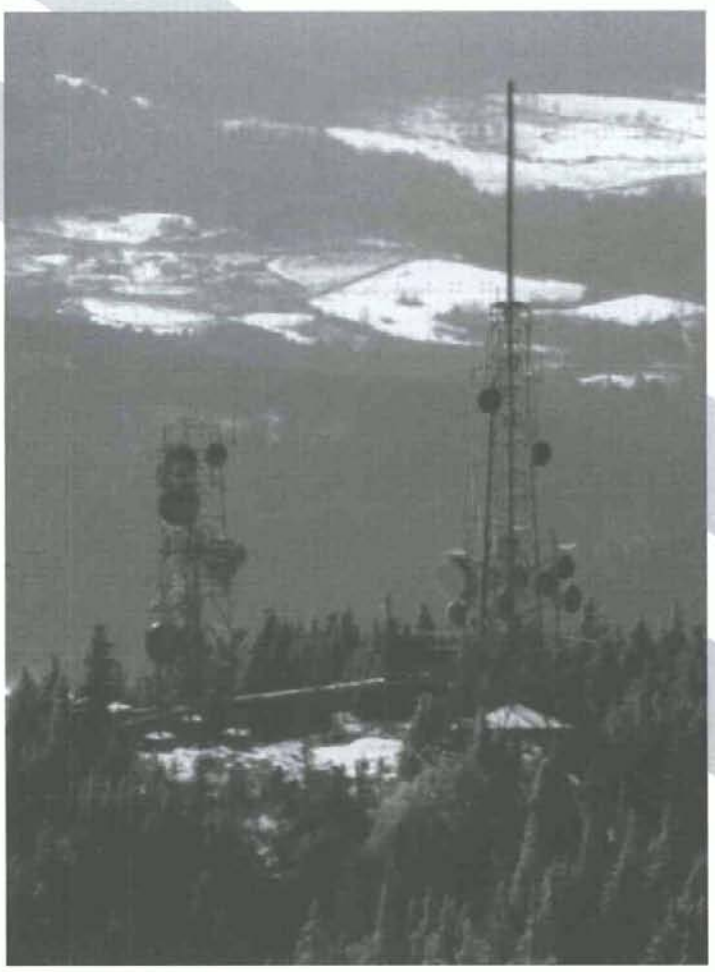
But federal preemption is a point of contention that has, if anything, been exacerbated since last February, when Congress passed the Telecommunications Act of 1996, a sweeping update of the 1934 legislation.

At first glance, the act appears to give fresh blessing to state and local authority. Section 704, dealing with siting policy, states: "Except as provided in this paragraph, nothing in the Act shall limit or affect the authority of a state or local government or instrumentality . . . regarding the placement, construction, and modification of personal wireless service facilities." But the paragraph "provides" as follows: No state or local action can "have the effect of prohibiting the provision of personal wireless services," or "regulate the placement, construction, and modification of personal wireless service on the basis of the environmental effects of radio frequency emissions if such facilities comply with the [FCC's] regulations concerning emissions."

It's a lawyer's treasure-trove, posing a knot of conflicting interpretations for the courts to untie.

Consider, first, that the subject matter is divided into two categories: Think of them as broadcast towers, which beam the signals to your car radio at drive time, and cell-phone towers, which make possible the "personal wireless service" addressed above in the Telecommunications Act. The technology used for both kinds of towers can produce two effects that neighbors and/or municipalities might find worrisome: Radiofrequency radiation, known as RFR, and radiofrequency interference, or RFI.

(For licensing purposes, the FCC considers RFI to be interference of one radio signal with another station's signal—a sort of traffic jam of the airwaves, which the agency is supposed to police. For lay people, however, RFI also refers to the unfortunate effect microwave signals can have on household, business, medical, and institutional electronic devices. It might cause them to malfunction—i.e., garage doors that don't open on electronic command, or open at the wrong times in response to some other signal—or it could cause the equipment to become damaged or disabled.)



Adding to the confusion that ensues when people wade into this morass of slippery but important distinctions is the difference between *emissions* of RFR and *exposure* to it. FCC law applies to exposure, not emissions; it attempts to limit the risk to employees and the general public from getting too close to broadcast transmitters. Recently, the agency's exposure standards have shifted; when new standards (which will still

*It falls to the Federal Communications Commission (FCC) to protect the population from such exposure. But Hutchins says the FCC has been hampered by trends since the Reagan years to downsize government.*

be well below those used in Europe) go into effect, exposure that is currently legal will become illegal—even though, obviously, the physical response between tissue and microwave won't be any different.

It is generally agreed that the Telecommunications Act language cited above removes one aspect of tower regulation from the arsenal of citizens who would mount localized protests: RFR from wireless communications facilities. The Act is silent about RFR from other facilities, such as broadcast towers, and it does not specifically address the jurisdictional boundaries over RFI (interference). So lawyers in the employ of citizens or companies must piece their legal arguments together by finding continuity in the language of disparate federal regulations and case law.

And what of other public concerns, such as aesthetic objections to constructing ungainly, Erector-set towers, festooned with clumsy disks and antennas, against a beautiful skyline? Companies can and do argue that these concerns clash with Congress' goal of providing Americans unimpeded cellular access.

## FCC's Doctors Are Out

The scientific community, which has been divided for nearly 20 years over the public health relevance of low-frequency power lines, has similarly not reached consensus about public dangers posed by these higher-frequency facilities. Microwave transmissions are within the non-ionizing spectrum, meaning that under normal circumstances—that is, outside of their direct beam close to its source—they do not heat body tissue. But is there a danger from long-term, nonthermal exposure?

That uncertainty is just one of the conflicts Vermont faces in an era in which the telecommunications industry has convinced Congress to write into law the doctrine that every cellular-phone-toting American has an inalienable right to be free from "dead spots" along the nation's highways and byways. As the citizens of Charlotte, Vermont, have discovered, broadcasting towers can pose unexpected interference problems, causing or contributing to the malfunction of electronic devices that households, offices, and schools in other communities take for granted. (See "Charlotte Vs. The WIZN Radio Tower," page 14.)

Altogether, these health, safety, nuisance, and aesthetic concerns present Vermont with perhaps the most complex menu of environmental dilemmas its citizens have ever encountered—a jolt from the 21st century as the chickens hatched by 20th century inventions come home to roost.

"Radiofrequency emissions may be more nefarious than smokestack emissions because you can't see them," says Mark Hutchins, an engineer and consultant from Brattleboro who specializes in helping broadcasters overcome problems related to interference and facility siting. "The commercial FM band is within the human resonance range," he says, which means that human tissue absorbs its radiation. But because the penetrating radiation bypasses the normal pain mechanisms, our bodies don't feel the heat and pull away from it.

It falls to the Federal Communications Commission (FCC) to protect the population from such exposure. But Hutchins says the FCC has been hampered by trends since the Reagan years to downsize government. Under the Environmental Protection Act, the FCC is responsible for establishing exposure standards, but it has never pretended to expertise in health and safety or environmental matters. Other agencies, like the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA), have not had the funds to support studies that might provide objective government standards.

So the FCC has adopted guidelines from organizations that some observers consider suspect because they are linked to commercial and/or military interests. For years, the EPA considered those American National Standards Institute (ANSI) and International Electricians and Electronics Engineers (IEEE) standards to be seriously flawed. In August, the FCC adopted new standards from the National Council of Radiation Protection and Measurement (NCRP), which Hutchins and others believe will be an improvement when they take effect some time in 1997.

But remember—the standards are for exposure, *not* emissions. A licensee might simply be required to post signs or erect fences to keep the public at a distance.

And, Hutchins says, even the new NCRP standards calculate only for thermal exposure. Questions about long-term, low-level exposure remain unaddressed.

## Examining the State's Arsenal

In Vermont, district environmental commissions have sought to apply three of Act 250's 10 criteria to cellular services projects: Criteria 1 (air pollution), 8 (aesthetics), and 10 (conformance with town and regional plans). Opponents of the radio tower in Charlotte are adding other criteria to this list, pertaining principally to the town's wish to protect its investment in educational technology at the Charlotte Central School.

The "air pollution" cited in Criterion 1 is RFR and RFI. The industry argues that since Act 250 does not define air pollution, and Vermont's Agency of Natural Resources includes neither RFR nor RFI in its regulations, there is no basis for examining projects under this criterion. But the federal EPA, guided by the Clean Air Act, has stated in the context of occupational exposure that RFR is a form of air pollution. On this point, Vermont's public planning law concurs.

The Environmental Board has applied its "aesthetics" criterion to at least two tower projects on the basis of their incompatibility with their natural surroundings. One was an existent 180-foot radio tower in Randolph owned by Stokes Communications Corporation, where the owner had

*"VNRC believes Vermont needs a comprehensive siting policy that will make it a leader in determining how these facilities should be located. That's where we started on this whole debate, and that's what we'll continue to press for."*

— Stephen Holmes, VNRC Acting Executive Director

balked at installing shields to prevent the red, airplane-warning lights from being seen from the ground. The ruling drew the ire of the Stokes Corporation, which later became active in seeking legislation to weaken Act 250's role in tower siting.

Criterion 10 was the basis for the board's rejection of a proposed 110-foot communications tower on Bemis Hill in Rockingham. The decision turned on the regional plan's specific instruction that developers first seek to "co-locate" new facilities at existing transmission and receiving stations. The Environmental Board has not promoted co-location as an antidote to proliferation. But the regional plan's clear language bought the Windham County town at least a temporary reprieve from another new Erector-set tower on its horizon.

Microwave towers have fared well under Act 250. In January 1996, Environmental Board Administrator Michael Zahner wrote to a legislative committee: "Over the past five years, 32 Act 250 permits were issued for broadcast and communications towers . . . Clearly, Act 250 has not impeded [their] construction."

But the few tribulations such projects faced on their way to approval resulted in attempts in the Legislature last winter to diminish the limited powers Act 250 has in this regard. Specifically, three bills were proposed, each meeting resistance from VNRC.

Sen. Jeb Spaulding, D-Washington, himself a former radio station owner, sponsored S.329, which would have provided that, "for purposes of Act 250,

# Shades of Things to Come

## *How A Tower Proposal Divided a Vermont Town Fifteen Years Ago*

At the time, it would have taken some prescience to know how common the story would become. But in 1984, when a group of more than 100 citizens from the northeastern Vermont towns of Sheffield, Wheelock, Lyndon, and Glover mounted an organized opposition to a microwave communications tower proposed by the Vermont Electric Power Company (VELCO), the debates over this new technology were in their infancy.

Yet all the elements that in the ensuing 15 years have become focal points when citizens and communities contend with microwave facilities sprouting upon their hilltops, were there in the conflict that was waged before the District 7 Environmental Commission.

Primarily, though, the case turned on the issue of aesthetics—which was heightened in the Sheffield tower case by the proximity of the proposed site to the natural amphitheater in Glover where the famed Bread and Puppet Resurrection Circus is held every summer. The 105-foot tower, rising 60 feet above the treeline and sporting a pair of metal dishes 10 feet and 8 feet in diameter, would have been visible to the gathered thousands two miles away as they sat on the slopes watching the pageant. Not lost on anyone was the irony that the story line in that visually dramatic event frequently depicts conflicts between a simple agrarian life and a combative technological world.

Looking back, the Sheffield story provides an interesting perspective on events in Vermont as they developed through the 1980s and 1990s. The case caused bitter divisions in Sheffield as combatants brought different aesthetic values—grounded in very different lifestyles—to the table. This was a year before the Environmental Board's Quechee decision, which introduced some consistency to questions of aesthetics in Act 250 deliberations. In Sheffield, the lack of such standards added fuel to the fire, ensuring that the disagreements would take an unfortunate personal turn.

Interesting, too, is that VELCO wanted the Sheffield site as one of three tower stations it would build in the Northeast Kingdom to monitor and control power flows over the new transmission-line corridor carrying electricity from Hydro Quebec to the grid that supplies power for New England. Much of the support expressed for the Sheffield tower was rooted in economic considerations: Hydro Quebec power promised to be plentiful, reliable, and inexpensive. Now, in 1997, Vermont utilities are trying to renegotiate their Hydro Quebec contracts because the Canadian power has risen above market prices.

People opposed to VELCO's project also expressed

*continued on next page*

*"At our public hearings, engineers testified that the higher the tower, the more likely it is that transmissions will have less potential health impact. On the other hand, the higher the tower is, the more it conflicts with aesthetic concerns people have."*

— DPS Telecommunications Planner Bill Shapiro

radio waves emanating from radio towers will not be considered air pollution."

Several parties saw the danger from such a sweeping exclusion. Zahner advised the Senate Natural Resources Committee that review of projects by Act 250's district commissions "is consistent with the FCC's policy that local and state authorities share a role in ensuring a community's health, safety, and welfare. The Legislature should not deny local review in those rare instances where a licensee may not comply" with the FCC's standards.

VNRC's Stephen Holmes saw the bill as another attempt to slice off a chunk of Act 250's authority.

"There's a statutory link between Act 250 and the state's municipal and regional planning law," Holmes explains. "Act 250 can employ the standards used in those public planning processes, and Title 24, Section 4407 says that municipalities are empowered to regulate noise, vibration, smoke, dust, odor, heat, cold, dampness, electromagnetic disturbance, etc.

"That legislative effort was driven by Stokes Communications, which was seeking to strip jurisdictional oversight completely out of Act 250. The Legislature was right to reject it."

Still, the Spaulding bill passed the Senate before fading in the House.

Another defeated Senate bill, S.209, would have overridden municipal zoning laws.

"The intent was that if you don't make provisions in zoning to allow cellular facilities, you have to treat them as a conditional use in any district," says Holmes. "Any district! It appeared that the cellular industry was mounting a full-court press, trying to make the most of a pro-business Legislature."

A third bill, however, was successful, and its ramifications are of some concern to VNRC.

H.795 promotes the use of state-owned property (lands and buildings) for siting wireless communications facilities. Holmes says the bill in its original form would have created a closed bargaining process enabling the secretary of administration to make decisions about public lands without public scrutiny. But conservationists and consumer advocates won certain modifications. In its final version, the bill calls for creation of a group drawn from the public and private sectors—including consumers—to review contracts between the state and facilities owners.

"We still believe the state needs a comprehensive siting policy that will make it a leader in determining how these

***Shades of Things to Come***
*continued from page 11*

concern that microwave transmissions from the hilltop would endanger their health. VELCO's lawyer reminded them that there were 67 such towers in Vermont, with no reported public health consequences. Fifteen years later, with microwave transmission stations employed by town rescue units, county sheriffs departments, countless business interests of all descriptions, and three cellular telephone companies, those 67 towers seem a pittance.

In the end, the decision on the Sheffield project was based on aesthetics. In fact, when the district commission rejected VELCO's proposal by a vote of 2-1, it was the first time a major project in Vermont had been turned down for an Act 250 permit solely on aesthetic considerations.

But like many conflicts, this one ended in compromise. VELCO appealed the decision to the state's Environmental Board, and the board handed the company a permit. However, it reduced the height of the tower from 105 feet to 76 feet, and scaled down the dishes from 10 and 8 feet in diameter to 8 and 6 feet. The tower, according to one long-time participant in the annual Bread and Circus Pageant, is visible from the amphitheater, but unobtrusive.

Hopefully, time has also healed the schism between citizens in Sheffield, who were barely speaking to each other when that conflict was at fever pitch.

*The few tribulations tower projects faced on their way to approval resulted in attempts in the Legislature last winter to deplete the limited powers Act 250 has in this regard.*

facilities should be located," says Holmes. "That's where we started on this whole debate, and that's what we'll continue to press for."

Gerald Tarrant, a former DPS commissioner and now a Montpelier-based attorney who represents both broadcasters and citizens groups in siting-related disputes, believes a solution to the conflicts in Vermont could be found if the Environmental Board had legislative authority to require applicants to file a comprehensive "master plan" outlining their objectives in the state. Such plans are often requested when developers apply for Act 250 permits for commercial development; they enable district commissions to examine projects for their overall environmental and municipal impacts, avoiding the faulty assessments that can result from piecemeal evaluation. If master plans were required, they could also eliminate machinations that enable companies to wiggle through the Act's 10-acre loophole.

Furthermore, Tarrant believes that a legal opening for towns to exercise authority over microwave facilities lies in the federal requirement that they meet FCC regulations. The agency does not have the means to monitor its many thousands of licensees, which means that if one operates out of compliance, citizens might suffer for years until the renewal date rolls around.

Rather than leaving that to chance, Tarrant suggests the state could levy a fee on all such facilities, and with the funds thus generated equip some company or public servant with devices for checking—at the behest of municipalities—the exposure to radiation of residents, businesses and institutions.

"I think such a system could work well and be in everyone's interest," Tarrant says. "It could provide reassurance to local citizens and help tower owners by removing an issue, a concern, that could cause them difficulties down the road."

And crucially, Tarrant believes a comprehensive Vermont system of master plans and fees for transmission applicants would complement, not violate, federal law.

"That's the key," he says. "It's not preemption. It would dovetail with federal regulation, not thwarting the goals of the Telecommunications Act but giving Vermonters an avenue of protection they want and need."

## When Public Interests Collide

If anyone is getting a taste of the complexities and clashing public interests regarding microwave towers, it's Public Service Commissioner Richard Sedano. For in addition to its other provisions, H.795 required Sedano to study the public health and radiofrequency interference issues and report to the Legislature.

That put his department smack in the middle of issues that have stumped many a scientist and regulator to this point. A perfect example is the collision of exposure and aesthetic considerations.

"At our public hearings in Hinesburg and Rutland," says DPS Telecommunications Planner Bill Shapiro, "engineers testified that the higher the tower, the more likely it is that transmissions will go over people's heads and have less potential health impact. On the other hand, the higher the tower is, the more it conflicts with aesthetic concerns that people have."

Nor does co-location—the mitigating effort summoned in Windham County's regional plan—provide a simple solution.

"If you add up all the frequencies and all the impacts, the effects of radiation from several users joined at one location could exceed the FCC's exposure limitations," Shapiro explains. Also, clumping more dishes and antennas together can transform a relatively unobtrusive spire on a hilltop into something truly unsightly.

Sedano, however, accepted the challenge handed his department.

"We're used to facing tradeoffs, not only of competing public goods but of competing public bads," he says. "We know we're not going to invent any science here. We'll talk about what people think the science is. But the science is inconclusive. That uncertainty will of necessity make more modest the force of whatever we will have to say." (The study, titled *Radiofrequency Radiation: Health Effects and Interference*," was ready for the lawmakers when they returned to Montpelier on January 7; however, early review of the report suggests more work is necessary.)

No such uncertainty pertains to Sedano's view of the state's role as a landowner in the communications tower marketplace.

"We're not after the money, but one of my strong convictions is that the state shouldn't subvert the market," says the commissioner. "The companies are going to pay somebody. If state land or property provides the best site for them, and if it works well for us, then we should offer it at a fair rate."

He extends the same advice to Orange County's Sheriff Frank, who is troubled by the prospect of co-location requirements forcing companies to request space on the county's new tower on Mt. Pleasant.

Says Sedano: "Tell the sheriff if he's in a position to make a buck on this for the taxpayers, he should."

It's clear, after all, that there are a lot of bucks to be made from the very salable commodity of microwave communication. Vermont's challenge will be to craft effective responses to the pressure that telecommunications companies are applying on our municipal and natural resources as the companies expand—and to craft those responses quickly—before the industry's build-out in this state is a done deal.

### For More Information:

VNRC is publishing a comprehensive paper on the issues of tower siting and electromagnetic fields in Vermont, which will be available in late Spring, 1997. Please call VNRC at (802) 223-2328 if you are interested in ordering a copy.

# Charlotte Vs. The WIZN Radio Tower:

## *A Test Case for Vermont*

Pease Mountain and Jones Hill represent high ground in Charlotte. To the west of Route 7, as it proceeds southward in Chittenden County toward Middlebury and Rutland, Charlotte spreads out like an extended hand toward Lake Champlain. The roads are flat and the fields are fertile.

But Pease Mountain and Jones Hill lie in the other direction, east of the well-traveled thoroughfare. Despite their modest height (the mountain is 784 feet above sea level, the hill 653 feet), they form somewhat of a geological aberration in the low-lying Champlain Valley. Departing Route 7, Church Hill Road winds quickly into the trough created by the two humped hills. It is on the rise to the north—Jones Hill—where Holly Fournier lives with her husband and two-year-old son.

Virtually at eye level from their driveway, across the small valley and about two-thirds of the way up Pease Mountain, stands the Fourniers' nemesis: An FM transmission tower owned by the Burlington-based radio station WIZN. Holly Fournier has testified that in her home and office (she is part-owner of an investment firm and works above the garage, where she listens for her child's waking cries with a baby monitor), her electronic equipment experiences repeated interference and malfunctions. Her computers and phone system, her TVs, stereo receivers, and clock radios, her postage meter, and the baby monitor at times behave erratically, and at times don't behave at all. The culprit—WIZN's transmitter—stands resolutely across the little valley beaming the disruptive signals that cause these episodes of radiofrequency interference (RFI) day and night.

Holly and her family are not alone. In an informal survey that she and her neighbors Mary Beth Freeman and Elaine Ittleman conducted a year ago, 88 Charlotte residents and businesses reported electronic interference, ranging from the annoying, to the troublesome, to the bizarre ("singing" toasters—the WIZN signal apparently being picked up by utility lines and delivered into homes through the electric wires).

The owner of a local energy-systems business claims that RFI disabled a series of telephone answering machines, impairing communication with his customers, until he gave up and contracted with an answering service at considerable cost. A local veterinarian complains of problems with her pager and with a heart-monitoring device she uses for sick animals. The pastor of the Charlotte Congregational Church, which is nestled along the road that separates the mountain and the hill, reports interference problems with the public address system, with headsets worn by parishioners who are hard of hearing, and other electronic devices.

The Charlotte Central School, around to the east of Pease Mountain and out of the line of sight of the WIZN tower, contains an investment by the community of some $400,000 in computers and other educational technology. The school board says the equipment, and thus the curriculum, are plagued by malfunctions and down time. It blames the broadcasting tower.

Not lost on these residents, business owners, and town institutions—the church, for example, has at times served the community as a kindergarten—are the public health implications of the interference they experience in their equipment.

"Our bodies are electrical fields," Holly Fournier points out. "Interference is a byproduct of radiation, so what's going on with this electrical equipment is an indication of what's going on in our bodies."

## A Cauldron of Issues

*Charlotte* has become synonymous in Vermont with all the troubles, doubts, fears, and frustrations citizens have begun to feel toward communications towers of all sorts. It is Vermont's highest-profile case of interference, and the symbolic connection Fournier draws to the unresolved public health issues surrounding microwave technology makes Charlotte's predicament all the more compelling. For even though you can't see the seemingly random signals that have caused a chaos of electronic interference in that town, the annoying results in Charlotte are tangible—more so than the invisible radiation that people in other places suspect is threatening harm to their bodies and brains.

Charlotte is an important case for other reasons, as well. It is there that crucial issues of local and federal jurisdiction are being played out—and where determinant decisions may be made concerning Act 250, zoning, and the proper province of the Federal Communications Commission (FCC).

Fournier and Freeman are the primary forces behind Citizens for the Appropriate Placement of Telecommunications Facilities, a citizens group with 200 members formed to find some way to rid the town of its plague of RFI. "We're not trying to run WIZN out of business, but we want them to find a more appropriate location for the tower," says Fournier.

The siting of the structure, most agree, is the primary problem.

"It's too low on the hillside," Fournier says, meaning that the signals beamed from its 199-foot tower do not sail harmlessly over her home on Jones Hill but carom closer to the ground and thus to people's real and personal property. (The topmost acreage on Pease Mountain is owned by the University of Vermont and is off limits to the station.) Some people also believe WIZN's 50,000-watt signal is stronger

*Activist Holly Fournier, a primary force behind local citizen's group.*

than it needs to be to serve its licensed area.

The station's personnel insist they are fully in compliance with FCC standards. They have made efforts to appease the town's citizens, replacing damaged equipment in some cases. But the ultimate remedies would be either to raise the tower significantly—sections can be added or removed from these structures—or to dismantle it. With a small airstrip located nearby, with a 200-foot height limit placed by the Federal Aviation Administration on unlighted towers, and with certain opposition from the Zoning Board of Adjustment, adding further height to WIZN's facility is out of the question.

Another factor is the sharpening animosity toward the station expressed by local officials, who are grating over assurances by the broadcasters in 1987 that the transmitter would cause no problems and that WIZN would take care of any that did arise. The Charlotte Select Board, in a November 1996 letter, forthrightly told WIZN Station Manager Arthur LaVigne: "Simply put, your presence is not desired" in Charlotte. This, despite the fact that in addition to a microwave antenna for cellular phone service owned by Bell Atlantic NYNEX Mobil (BANM), the tower also hosts communications equipment for the town's fire and rescue company.

The legal effort to bring about a solution is being waged at almost every conceivable level, including the town zoning board, the District 4 Environmental Commission, the Vermont Environmental Board, the state's Environmental Court, and federal district court. Issues include:

- A contention that the tower was erected at the wrong location (even though a zoning official was on hand when the stakes were driven), and therefore violates regulations separating commercial and residential zones. The station and its engineering consultants firmly dispute the allegation.

- Whether the FCC, which licenses broadcasters, has exclusive jurisdiction over the regulation of RFI. WIZN, citing federal law and the Telecommunications Act of 1996, contends that it does, and they convinced the Zoning Board the town was powerless in this regard. But Gerald Tarrant, the attorney representing the citizens group, submitted a motion to federal court that asserted: "The Town of Charlotte is not preempted from exercising reasonable oversight and control over radio and cellular services that cause pervasive, harmful interference to . . . its citizens." Local authority *is* preempted regarding the siting of facilities for personal wireless services, but as for broadcast facilities, Tarrant has said, the FCC's intent is that "you can't have a radio station that conflicts with another radio station . . . The FCC does not (monopolize the law) in terms of toasters and computers and garage door openers. I believe if you read the Telecommunications Act properly, it preserves state and local authority" over such RFI issues.

- Act 250 permits, both for the BANM antennas that were added to WIZN's tower in 1991, and for the tower itself. BANM applied for and received a land use permit from the district commission, but tower opponents now want the permit revoked, claiming the company neglected to notify adjoining property

owners (who are automatically parties to hearing proceedings under the law) of impending review of the project. WIZN never did receive an Act 250 permit to construct the tower, based on the premise that the site was less than the statutorily required 10 acres. More recently, though, District Environmental Coordinator Lou Borie ruled that the full project totals 17 acres in "involved land," and he ordered WIZN to apply belatedly for a permit. That set off a string of appeals and motions before the commission and the Environmental Board. Given the circumstances that have developed in the ensuing 10 years, a hearing now would be far more contentious than in 1987. The commission, the board, the radio station, and the citizens group are maneuvering, with the citizens laying the groundwork for party status on issues new to the Act 250 process as it has related to tower projects in the past—particularly concerning the town's investment in its schools.

### 'Electronic Abutters'

In terms of precedent, then, as the state adjusts to the new realities of the 1996 Telecommunications Act and the proliferation of broadcast and cellular towers in communities everywhere, a lot is riding on the multifarious Charlotte/WIZN legal proceedings. Interesting new concepts could come out of it—that is, if imagination and a concern for the public interest can gain a foothold over partisanship and the narrow, inflexible view.

For example, an idea floated by broadcast consultant Mark Hutchins of Brattleboro is the concept of *electronic abutters*, which would be a new category of statutory participants in Act 250 proceedings. Hutchins explains that the RFI problems in Charlotte were eminently predictable, and thus avoidable had the proper science been applied.

"It would have been much better, early on, to have the larger group of people affected by (the development) involved. Instead, we're nit-picking over issues of involved acreage. In the case of WIZN, what we have is an involved village."

Charlotte, in all its legal and regulatory manifestations, will be a test case for the way Vermont responds to a 21st century technological and cultural challenge. And in a sense it will be a test of our mettle: Can we learn from the dispute, and enable policy to evolve relative to siting, land use, and other considerations inevitably linked to transmission towers?

Or will heels be dug in and no quarter given, dooming all sides to trench warfare over Vermont's high ground—one green hill and one mountain peak at a time?

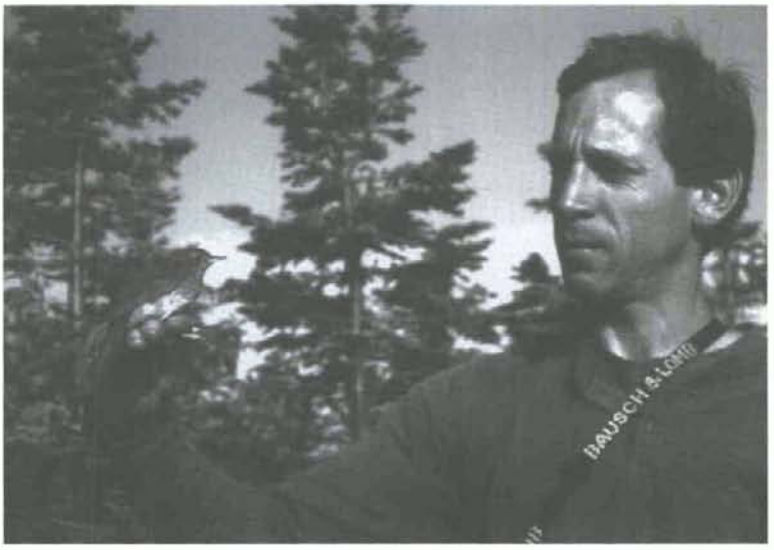
# Alpine Development Squeezing the Bicknell's Thrush

Our high-elevation mountaintops in Vermont aren't what they used to be. Acid precipitation and cloud water pollution have corrupted the soil and stunted the red spruce and balsam fir that dominate those subalpine peaks.

Humanity has intruded more directly at these elevations, too. Ski resorts have carved great swaths though the woods and planted gondola terminals and restaurants near the once-remote summits. Even activities with more benign environmental purposes, such as wind-power installations and backpacking trails and shelters, have encroached upon lofty heights that people once admired from afar.

Add now to these intrusions transmission and communications towers, which began to appear in the middle of the century (WCAX built its first tower on Mt. Mansfield in 1953) but are proliferating as telecommunications technology expands in Vermont.

The world, then, must seem quite different to a Bicknell's thrush. For the mountaintops that are being altered—in some cases radically, in some a little at a time—are the thrush's summer habitat. Its winter range is, if anything, even more threatened. Much of the Caribbean rainforests have been clear-cut or burned as human populations grow in Haiti and the Dominican Republic, where the Bicknell's is known to migrate. (This songbird had its moment of glory in December, 1995, when a research biologist netted a Bicknell's thrush in the Dominican that he had captured and banded earlier that year on Mt. Mansfield—a most improbable occurrence reported widely in the media.)




*Chris Rimmer tags a Bicknell's Thrush on Haystack Mountain.*

Christopher Rimmer, a Vermont Institute of Natural Science (VINS) biologist who is leading a comprehensive research project on the Bicknell's thrush, wrote in the April, 1993, issue of Bird Observer: "At both ends of its migratory spectrum, Bicknell's thrush may be

# Taking the Measure of Aesthetics

"I'll take six pounds of aesthetics, too, please," says the customer to the store clerk.

"Certainly," the clerk responds. "What kind would you like? We've got some lovely 16th century sonnets; we have serenity derived from contemplation by a peaceful river; we have some wonderful vistas . . . views of the Green Mountains at sunset. There's aroma of gardenias over there, and we might have a little massage therapy left.

"Or would you like the Chopin?" she continues. "We're having a special on the Chopin this week."

"Oh, I'll take the views," the customer says eagerly, smiling as she opens her purse. "How much?"

"The views are $2.99 per pound," the clerk answers, plunging a stainless steel scoop into the bin of dramatic mountain tops framed in azure sky and wispy, roseate clouds. "Paper or plastic?"

Would that it were so easy! We can quantify much of what we hold valuable in life, but our aesthetic pleasures generally escape such precise bookkeeping. Of course, there is the price of a novel, a pair of concert tickets, or airfare to the Bahamas; but the grander things—the gifts derived from nature and the effect they have upon the human heart—seem almost impossible to tally, even more so because we do not all hold them in the same esteem.

Increasingly, though, it matters what value we put upon them. That's because the world and it's beauties are finite, while the appetites of burgeoning humanity seem infinite. Thus we have divined systems that attempt to translate aesthetics into practical, universal terms, and in some respects to affix monetary value to their importance to us.

In Vermont, for example, Act 250 seeks to protect and preserve the aesthetic of unencumbered beauty. Criterion 8 of that law requires that a development project "Will not have an undue adverse effect on the scenic or natural beauty of the area." Yet aesthetics prove slippery, the meaning of *undue* and *adverse* shifting with the eye of the beholder. A microwave transmission tower erected on an otherwise undisturbed peak might be offensive to one viewer, a thing of beauty to others (technology buffs, or people with investments in the cellular communications industry), or an unnoticed irrelevance to someone else. How, then, to apply the law?

In more practical terms, such a tower might lower the value of a person's property. If the house was built to take advantage of a lovely view that adds to the property's worth, what is the impact on the owner's investment when a company plants a 180-foot tower, dangling dishes and antennas, directly in the line of sight?

Vague and disputable as these concepts may seem, there are people who are wrestling with them, trying to give form to the commerce and legalities that surround them. The quantification of visual aesthetics is evolving. We do not have a formula for determining exactly how much the tower on the horizon subverts the homeowner's investment, or whether the impact of the tower will be *undue* in everyone's eyes, but the sheer expansion across our landscape of wireless communications towers and TV and radio broadcast facilities may bring us closer to consistent reckonings.

## How Much is that Vista in the Window?

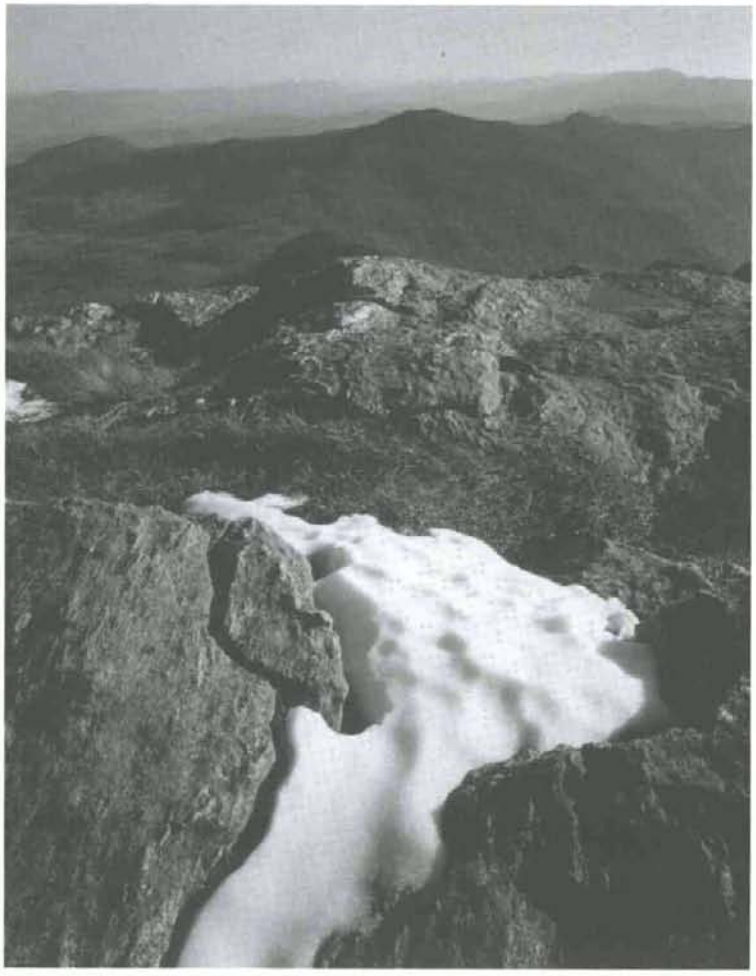
First, though, a body of data is needed, and in the realm of real estate Vermont is a difficult place to accumulate it. Economics professor Myrick Freeman of Bowdoin College in Maine observes that sophisticated statistical analyses have been performed and published which

measure the effects on property values of many environmental factors.

"In the literature where these things have been studied, effects can be found," Freeman says. "They're predictable."

But he adds, with Vermont in mind: "I'm not aware of studies looking at rural locations. In rural areas the number of properties is small, which undermines the statistical validity of any results that might be found. Also, rural properties tend to demonstrate a great deal of heterogeneity." The wide variety of property sizes, uses, levels of maintenance and other variables in a place like Vermont makes it difficult for economists to establish categorical definitions of properties.

"The studies are mostly done in urban areas," Freeman concludes.



Frank Bredice provides a less academic perspective but reaches the same conclusion. Bredice, a professional real estate appraiser based in Montpelier, says the key to establishing consistent readings for any impact upon property value—whether it's the difference between a one-car and a four-car garage, or a home with a pristine view of rolling hills contrasted with another whose views are encumbered by cell-phone facilities—is finding "paired sales."

"You find houses that are the same in every other respect," he says (including having been purchased by new owners), "and you subtract the value of one from the value of the other. That way you get a market-oriented adjustment for that factor. That's the best way to quantify the economic impact" of the smaller garage or the visible tower.

Like Freeman, Bredice says the data are limited in this state because "you don't have 40 or 50 [comparable] properties to deal with."

Still, Bredice ventures this observation: "It's a pretty good truism that the higher the value [of a property] the more of an effect there is from positive or negative variables. In a ski-area property with a great view, an aesthetic intrusion may well have a more marked impact."

Then there is the human variable. Real estate agents say that a view—be it a sweeping view of the Worcester range or the more proximate view of the disheveled yard of the neighbors across the road—matters more to some buyers than others.

"A tower in the distance . . . ?," says Barbara Leber of Millette Real Estate in Montpelier. "It could be an issue with somebody. But they may overcome it if it's the only negative."

More common in her experience is the effect on property salability from utility poles.

"I've seen people look at land that has wires across it and they won't even consider it," says Leber.

Her experience is borne out nationally, and it may be simply because the century-old electric utility industry has had time to develop more case law. Whether the reason is aesthetics or human health—people worry about the health effects of microwaves, but similar concerns about electromagnetic fields (EMFs) from high-voltage transmission wires have resulted in significant litigation—the deleterious effect of utility equipment on property values has been affirmed, at least in the courts of New York.

Attorney Michael Rikon of New York City argued and won the 1993 case, Criscuola v. Power Authority of the State of New York (PASNY), before that state's Court of Appeals. Overturning the decisions of lower courts, the Appeals Court ruled that the claimants were entitled to compensation from PASNY because its transmission lines (erected on the Criscuolas' property under the doctrine of eminent domain) had prevented them from selling an otherwise viable chunk of real estate.

Importantly, the court did not make a scientific determination on the validity of public fears about electromagnetic fields. The perception of danger, the court said, was enough: "Whether the danger is a scientifically genuine or verifiable fact should be irrelevant to the central issue of market value impact."

The Criscuola ruling has had limited impact thus far, even in New York. But attorney Rikon, speaking in November at the Vermont Law School's conference at Killington on "Health and Policy Implications of the Wireless Revolution," said it gave weight to the intertwined concerns about safety and aesthetics regarding EMFs.

"The science is all very interesting," Rikon shrugged, "but I don't care. What matters is that the public is greatly concerned. I know from realtors that they'll show a home with a power line running across the property and the people won't even get out of the car."

The EMF debate, with its property value implications, seldom rises in Vermont to the pitched level it has attained in states where high-voltage lines are prevalent. But

the point is that property values are a gut-level issue everywhere; factors that threaten our lifestyle flexibility (the ability to buy and sell) and our investments in real estate could loom like great, dark shadows on Vermont's horizon.

### Reckoning the Landscape

Real estate is one domain in which we seek to define and quantify aesthetics. Public policy is another.

The primary vehicles for protecting our scenic resources in Vermont are town and regional plans, Act 250, and, increasingly, local zoning ordinances. These can reinforce one another; Criterion 10 of Act 250 requires developments, including tower projects that come before the district commissions and Environmental Board, to conform with "duly adopted local or regional plan(s)." In practice, says Richard Brooks of the Vermont Law School, zoning often is included in that prescription.

"Recent cases allow zoning, rather than a town plan, to be used in determining what a community's aesthetic policies are," Brooks explains, "rising out of situations where there was discrepancy between zoning and the plan, which can create a problem for the developer."

Thus, Act 250 offers two routes for considering aesthetic impacts—Criteria 8 (cited above) and 10. Yet in any case where those impacts are evaluated, there is a need for standards, drawn as objectively as possible, to be brought into play.

Several Vermonters have sought to do this. They include Jean Vissering of East Montpelier, a landscape designer, consultant, and part-time instructor at the University of Vermont; Elizabeth Courtney, former chair of the state Environmental Board and principal author of the book *Vermont's Scenic Landscapes; A Guide for Growth and Protection* (published in 1991 by the Agency of Natural Resources); the late Norman Williams, who chaired the committee supervising Courtney in that project and who was a national authority on land use law; and Project Coordinator Gina Campoli of the Agency of Natural Resources.

*Vermont's Scenic Landscape* is a colorful, 80-page book with beautiful photographs, maps, and designs. It was created for the purpose of putting clear language and concepts around the challenge of defining our aesthetic resources in Vermont, the better to preserve them. Guided by Williams' vision, the book is an underused resource in itself, awaiting the attention of local boards seeking tools that can help them protect the things they love most about their towns.

Primarily, says Campoli, Act 250 deliberations on aesthetics are guided by the so-called Quechee Decision of 1985. The decision addressed the critical but vague terms of Criterion 8, blazing a trail for later decisions to follow.

The accepted measure, after Quechee, for determining whether a proposed development is "adverse," is to decide whether it would be in harmony with its surroundings. A tower on the horizon is clearly not in harmony and is therefore *adverse*, but the next question is whether its impact is *undue*. The answer depends on

# VLS Hosts Conference on EMFs, Microwave Radiation

A cavernous conference room and dining area at Killington ski resort, where the thud of ski boots and schuss-booming braggadocio more commonly fills the air, resounded for two days in November with complex and sometimes contrasting scientific and legal pronouncements on the subjects of electromagnetic fields and radiofrequency radiation.

The Vermont Law School hosted a conference November 15-16, 1996, that attracted approximately 150 scientists, lawyers, state and federal regulators, educators, representatives of the cellular and broadcast industries, public interest advocates, and citizens personally affected by the spread of microwave technology. The event drew speakers and audience members from places as near as Charlotte and Montpelier, Vermont, and as distant as Poland and the San Juan Islands of Washington State. It was titled *Unplugged: Health and Policy Implications of the Wireless Revolution.*

Presentations on the first day centered on scientific inquiry. The conference followed by two weeks the release of a study by the National Academy of Sciences (NAS) that was reported in major news media to have determined that populations face no health hazards from the electromagnetic fields (EMFs) created by electric power lines. Power lines have been implicated, primarily through epidemiological evidence, in cases of leukemia in children.

But Dr. Keith Florig of Carnegie Mellon University in Pittsburgh said the NAS study was far from conclusive in dismissing such evidence. Florig said the NAS had misled the public by issuing a press release that stated, "No adverse health effects [are] seen from residential exposure to electromagnetic fields," while the executive summary of the report said: "An association between residential wiring configurations and childhood leukemia persists in multiple studies, although the causative factor . . . has not been identified."

Scientists were no more certain about health risks possibly posed by radiofrequency radiation (RFR) from cellular towers used for microwave communications, which are proliferating across the landscape. Acknowledging the inability of researchers to resolve questions related to EMFs and RFR, Florig said it was his belief that "the tools of science are not [yet] up to this task."

On the second day, legal and regulatory issues were debated. Lawyers discussed strategies for advancing lawsuits related to personal injury or loss of property value related to electric power lines, and for defending corporations from such suits. Later in the day, speakers and members of the audience probed U.S. case law and the

three questions:

1. Does the project violate a written community standard intended to preserve scenic beauty (i.e., Windham Regional Plan, which led to the initial Act 250 rejection of the Bemis Hill tower)?
2. Would the project's impact be offensive to the average person? Campoli says Act 250's district commissioners are deemed "average people," and the verdict rests on their sensibilities.
3. Has the applicant taken steps to mitigate the adverse impact? If not, that can be reason enough to reject.

While this test provides some measure of aesthetic impact, Vissering, landscape designer and consultant, says "some of the general approaches I use in normal development projects don't always apply to communications towers."

Recently, though, Vissering was hired by Atlantic Cellular Company and the Mt. Anthony Preservation Society to help site a microwave tower near Bennington. The company paid for Vissering's services, for it was in the interests of Atlantic Cellular to see the facility installed without challenge, but also in the Society's interest to lease the land so it could obtain capital to use for preserving more vulnerable acreage.

The planning exercise brought many issues into play, Vissering says.

"We looked at where the tower would be seen from . . . and it could be seen from the Bennington Battle Monument. So a site was chosen below the ridge line, just barely above tree level."

Another visual blight associated with towers is the utility company right-of-way, a wide swath cut up the forested slope to run power lines for the equipment at the top. "That almost creates more of an impact than the tower itself," says Vissering. At Mt. Anthony the offense was avoided by using a ground-level electric cable.

The height of the tower presented another visual problem until Atlantic Cellular offered to remove a section of the structure. "They seemed sensitive to the aesthetic issues," Vissering says.

Indeed, the inherent aesthetic problem with communications towers is their need for altitude so they can transmit their signals to customers throughout the "cell," or to relay to towers serving adjacent cells.

"That's one of the key issues—the fact that they're located on ridge lines, which are highly sensitive areas, visually," says Vissering. "Especially the horizon line. Anything that breaks up that line tends to become a focal point."

Violating hilltops, if only by adding an unnatural visible element to them, strikes at the core of something vital to humanity, she says. Vissering traces the importance to modern people of certain kinds of terrain to early human and societal development—peaks that provided a view, perhaps, of invading clans; grasslands with their host of prey; the shared edge of forest and meadow, from which primitive people could peer to decide whether they could safely emerge into the sunlight.

"We have a real spiritual connection with hilltops," Vissering notes. "They tend to be almost sacred ground. Building something jarringly out of character upon them seems almost like a sacrilege.

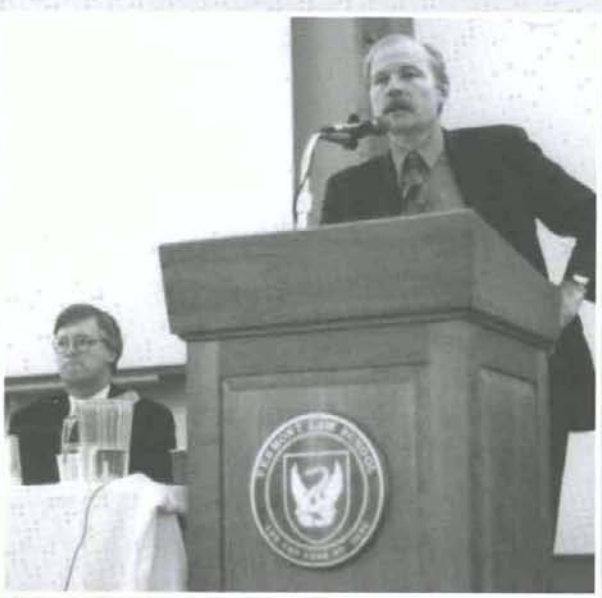
Telecommunications Act of 1996 to determine the boundaries of federal, state, and local jurisdiction over broadcast and cellular towers. Gerald Tarrant, a former commissioner of the Vermont Department of Public Service and an attorney active in tower-related cases, summed up the complexity of the scientific and legal issues. "We have gone from the invisible to the abstract," Tarrant said.

By far the most fervent testimony came on the second day of the conference, from advocates and citizens who were engaged in legal wranglings, primarily with the cellular industry. Their attestations amounted to a mini-rebellion in an otherwise staid and stolid conference.

In her lunch time address, science journalist and author Blake Levitt said, "We are dramatically altering the electric field of the world without knowing the consequences," and accused the industry of "arrogance" and "bullying." Cathy Bergman, of the EMR Alliance in New York, blasted cellular companies for employing federal trade laws to sue municipalities trying to reject tower sitings. She defended communities who had the "audacity" in this modern world to choose to be "dead spots" (unreachable by cellular telephones). Other speakers also related their frustrations dealing with companies erecting towers close to their properties or with the Federal Communications Commission (FCC) for failing to respond to their concerns.

Patrick Parenteau of the Vermont Law School, host of the event, announced that NYNEX had been invited to participate on a conference panel but did not attend. The FCC, however, was represented by two speakers.

The conference ended, as it had to, awash in scientific and legal contradictions. But it advanced the dialogue about issues that will only grow more important as the communications age—in both practical and physical terms—transforms the world we live in.



*Pat Parenteau of Vermont Law School fields questions during the conference as Gerald Tarrant looks on.*