DOCKET NO. 58

AN APPLICATION OF HARTFORD CELLULAR COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN HARTFORD, TOLLAND, AND MIDDLESEX COUNTIES.	:	CONNECTICUT SITING COUNCIL
	:	July 11, 1986

F I N D I N G S O F F A C T

1. Hartford Cellular Company (Hartford), in accordance with provisions of sections 16-50g to 16-50z of the Connecticut General Statutes (CGS), applied to the Connecticut Siting Council (Council) on January 15, 1986, for a certificate of environmental compatibility and public need (certificate) for the construction, maintenance, and operation of telecommunication towers and associated equipment buildings to provide Domestic Public Cellular Radio Telecommunication Service (cellular service) in the Hartford New England County Metropolitan Area (Hartford NECMA). (Record)
2. Cellular tower sites were proposed for the towns of Bloomfield (two), Glastonbury, Haddam, Hartford, Middlefield, Portland, Rocky Hill, Somers, and Willington, Connecticut. (Hartford 1, p. 2)
3. On April 14, 1986, the applicant amended its application to include a proposed tower site in the Town of Vernon. On May 12, 1986, the applicant withdrew one of its proposed Bloomfield sites and proposed a substitute tower site in the Town of Windsor. (Hartford 1, Exhibit 7, p. 4; Hartford 17, p. 2)
4. The application was accompanied by proof of service as required by section 16-501 of the CGS. (Record)
5. The fee as prescribed by section 16-50v-1 of the Regulations of State Agencies (RSA) accompanied the application. (Record)

6. Affidavits of newspaper notice as required by section 16-501 of the CGS were supplied by the applicant. Newspaper notices of this application were published twice by the applicant in the Hartford Courant, Manchester Journal-Inquirer, the Middletown Press, and the Willimantic Chronicle. Notice of the amendment for a proposed Vernon tower site was published twice by the applicant in the Hartford Courant and the Manchester Journal Inquirer. Notice of the amendment for a proposed Windsor site was published twice in the Hartford Courant. (Hartford 1, p. 5; Hartford 7, p. 2; Hartford 17, p. 3)
7. The Council and its staff inspected the proposed tower sites in the towns of Bloomfield and Hartford on March 18, 1986; in Willington and Somers on April 15, 1986; in Portland, Glastonbury, Haddam, Rocky Hill and Middlefield on April 17, 1986; and in Vernon on May 21, 1986. (Record)
8. Pursuant to section 16-50m of the CGS, the Council, after giving due notice thereof, held public hearings on this application on March 18, 1986, at 7:00 P.M. in the Bloomfield Town Hall in Bloomfield; on April 15, 1986, at 7:00 P.M. in the Center School in Willington; on April 17, 1986, at 7:00 P.M. in the Portland Public Library in Portland; and on May 21, 1986, at 7:00 P.M. in the Vernon Center Middle School in Vernon. (Record)
9. The following state agency filed written comments with the Council pursuant to section 16-50j of the CGS: the Department of Environmental Protection (DEP). (Record)

10. The parties to the proceeding are the applicant and those persons and organizations whose names are listed in the Decision and Order which accompanies these findings. (Record)

11. The Council took administrative notice of its complete record in Docket 56; in Docket 40, of Sections I-IV of the application and the Council's Findings of Fact, Opinion, and Decision and Order; in Docket 51, of the Council's Findings of Fact, Opinion, and Decision and Order; in Docket 11, of the Council's Findings of Fact, Opinion, and Decision and Order, and Volume #1 of the Application; in Docket 24, of the Council's Findings of Fact, Opinion, and Decision and Order; and of the Public Utility Environmental Standards Act, CGS 16-50g-z. (Record)

12. Exhibits in this application are as follows:

1) Application dated January 15, 1986; 2) Responses to Pre-Hearing Questions Set #1, dated March 14, 1986; 3) Responses to Pre-hearing Questions Set #2, dated March 18, 1986; 4) Responses to Questions dated April 4, 1986; 5) Responses to Questions dated April 11, 1986; 6) Zoning regulations of specified communities; 7) Amendement to application with Vernon site, dated April 14, 1986; 8) Site-line graphics from Talcott Mountain Science Center Observatory; 9) Dimension of spire atop Heublein Tower; 10) Responses to questions in Peter Cubeta letter dated April 9, 1986; 11) Two sets of 15½"x20" coverage maps; 12) Report on three Portland site alternates; 13) Response dated May 21, 1986, on Rosenfeld property; 14) Response dated April 15, 1986; 15) Response dated April 17, 1986; 16) Response dated May 9, 1986; 17) Amendment to application with Windsor site, dated May 12, 1986; 18) Response dated May 21, 1986; 19) Visibility from

Tilney property; 20) Calculations of power densities at Windsor and Vernon sites; 21) Cell coverage map for Talcott Mountain site with 100' tower; 22) Summary of all cost changes since original application; 23) FAA response to painting and lighting of Vernon and Windsor towers. (Record)

13. Cellular service consists of small overlapping broadcast regions, two to ten miles in diameter, known as cells. Each cell is served by a transmitter limited by the Federal Communications Commission (FCC) to no more than 100 watts effective radiated power per channel. Each cell has a central switching point containing electronic apparatus uniting the cells into a system. Mobile units are limited by the FCC to a maximum of seven watts of transmitted power. (Docket 56, Finding 11)

14. For the purposes of cellular service construction permit applications, the FCC has defined a NECMA consisting of Hartford, Tolland, and Middlesex Counties. (Hartford 1, p. 1, p. 8)

15. The FCC requires that a licensee serve at least 75% of its licensed service area within three years of obtaining an operating license or risk losing the license. The proposed Hartford Cellular system would cover at least 75% of the Hartford NECMA. (Hartford 1, p. 9; Docket 56, Finding 14)

16. Cellular service is an improved mobile telephone service. To date, mobile telephone service has been regulated by the Connecticut Department of Public Utility Control (DPUC). In DPUC Docket No. 85-07-16, the DPUC is considering regulations developed pursuant to Section 7 of Public Act No. 85-552 to determine the extent of state

regulation of cellular service providers licensed by the FCC. Eventually, cellular service could replace the existing simplex mobile service. Cellular service has been classified by the FCC as a form of basic local exchange service, which would also be subject to DPUC regulation. (Hartford 1, p. 31; Docket 56, Finding 14)

17. The FCC has determined that a national public need exists to improve the present mobile telephone service, due to the current system's limited capacity, long waiting lists nationally, and poor quality service, which have created congested channels and long waiting times. (Hartford 1, p. 6; Docket 56, Finding 15)

18. The FCC has established the technical standards for cellular service to insure the efficient use of the allotted frequency spectrum and to insure nationwide compatibility. (Hartford 1, p. 7; Docket 56, Finding 16)

19. The FCC has pre-empted the state's regulation of cellular service in three major areas: technical standards, market structure, and state certification prior to federal application for a construction permit. (Hartford 1, p. 7; Docket 56, Finding 17)

20. Applicants for FCC cellular system authorizations are not required to demonstrate a public need for cellular service, because the FCC has exercised its primary jurisdiction to determine that there is a need for cellular service generally and to encourage the development of cellular service nationwide. (Hartford 1, p. 7; Docket 56, Finding 18)

21. The FCC has reserved to the states jurisdiction with respect to charges, classifications, practices, services, facilities, and regulation of service by licensed carriers. (Docket 56, Finding 19)

22. According to FCC rules, there must be two licenses awarded in each NECMA to provide competition. One is awarded to a wireline company, the other to a non-wireline applicant. (Hartford 1, p. 7; Docket 56, Finding 20)

23. The FCC defines a Reliable Service Contour as an area having a signal quality greater than or equal to 39 dbu. The FCC requires 75% coverage of the cellular geographic service area. (Hartford 1, p. 9; Docket 56, Finding 21)

24. Cell-splitting accommodates the future growth of demand for cellular mobile service. Adding a cell between existing cells increases the number of calls which can be handled in an area. Cell-splitting adds cell sites containing lower power omnidirectional antennas, converts to directional antennas, or does both. (Hartford 1, p. 21; Docket 56, Finding 22)

25. Each new cell achieved by cell-splitting requires additional towers and/or associated equipment. (Docket 56, Finding 23)

26. An omnidirectional antenna radiates in 360 degrees, but may be blocked by part of the tower itself, an effect called shadowing. Terrain and buildings can also cause shadowing. (Docket 56, Finding 24)

27. Shadowing in urban areas can be reduced by overlapping coverage from two cell sites. Such overlapping fills in holes from shadowing and increases the possible number of simultaneous conversations. (Docket 56, Finding 25)

28. The potential for intermodulation interference and shadowing may be significant when antennas broadcasting independent radio signals are located on the same tower. (Hartford 3, Q. 13; Docket 56, Finding 26)

29. Hartford Cellular is a partnership 91% owned by Metro Mobile CTS of Hartford, Inc., which in turn is a wholly-owned subsidiary of Metro Mobile CTS, Inc., a corporation organized in the State of Delaware, with principal business offices at 110 East 59th Street, New York, New York. (Hartford 1, p. 2; Docket 56, Finding 27)

30. Hartford Cellular is authorized by the FCC to construct cell sites in the Hartford NECMA. (Hartford 1, p. 8)

31. Contingent upon Council approval and construction of the proposed cellular system, the applicant will seek a renewable operating license from the FCC. (Hartford 1, p. 9)

32. The FCC has authorized Hartford Cellular and other Metro Mobile affiliates to construct cellular systems in the New Haven, Hartford, and Bridgeport NECMAs in Connecticut as well as the Springfield NECMA in Massachusetts. (Hartford 1, p. 8; Docket 56, Finding 32)

33. The proposed Hartford NECMA and similar NECMAs in Bridgeport and New Haven, Connecticut, and Springfield, Massachusetts, all of which would operate as one system. (Hartford 1, p. 19)

34. A mobile telephone switching office (MTSO) would be located in Windsor to serve as one of the two MTSO's needed for the operation of the system and for interconnection with Southern New England Telephone Company's (SNET's) public switched landline network. A second MTSO would be located in Norwalk. (Hartford 1, p. 19; Hartford 17, p. 4)

35. To begin its search for potential cellular tower sites, Hartford Cellular developed a hexagonal grid for the area to be served, with the center of each hexagon representing a primary cell site location.

For uneven terrain, secondary cell sites were considered. (Hartford 1, p. 26)

36. Primary cell site search areas have a radius of 1.2 miles, and secondary search areas have a 0.6 mile radius. (Hartford 1, p. 26)

37. Using computer modeling, Hartford Cellular based site selections on the location of existing towers; elevation; impacts on residential, historic, scenic, or environmentally sensitive areas; possible interference from airports, transmission lines, or broadcast facilities; ease of access; and utility service. Computer modeling was used in the process of site selection. (Hartford 1, pp. 25-27)

38. The system as originally designed included a 10-20% overlap of cells to assure coverage. (Hartford 1, p. 27)

39. Typically, each cell site would contain a tower and an associated equipment building. Six of the cell sites would feature Rohn SSV Heavy series self-supporting lattice-type towers. Two of the cell sites would contain Rohn SSMW self-supporting lattice-type towers. There is some visual difference between Rohn SSV and SSMW towers, which contain more braces in their lower sections. One proposed site would contain a Valmont Radio Mast monopole, one proposed site would include shared space on an existing tower, and one would use a building roof top instead of a tower. (Hartford 1, pp. 10-11; Hartford 17, Exhibit 6, p. 10; Hartford 1, Exhibit G, pp. 1-4)

40. The Rohn SSV Heavy Series towers proposed for the towns of Haddam, Somers, and Willington would measure 22'x22'x22' at the base. The Rohn SSV Heavy Series towers proposed for the towns of Portland,

Windsor, and Vernon would measure 20'x20'x20' at the base. The Rohn SSMW tower proposed for Bloomfield would measure 22'x22'x22' at its base. The Rohn SSMW tower proposed for Middlefield would measure 27'x27'x27' at its base. (Tr. 3/18/86, pp. 24-25)

41. The proposed Rohn lattice towers would provide the strength and stability needed to support two transmit and three receive antennas, plus 100 square feet of loading capacity to allow for expansion. (Hartford 2, Q. 1)

42. The towers would be constructed of galvanized steel, which weathers to a gray finish. (Tr. 4/17/86, p. 157)

43. As a condition of leasing, the heavier towers proposed for the towns of Bloomfield and Middlefield accommodate shared use with the prospective lessors for paging services and conventional two-way land mobile technologies. No height increment would be necessary for such sharing. (Hartford 2, Q. 9; Hartford 4, Q. 33)

44. Hartford Cellular unsuccessfully attempted to gain shared use of existing SNET towers in the towns of Middlefield and Portland. (Hartford 1, p. 28)

45. All of the towers proposed in this application are designed for Zone A windloading with ½" radial icing under Electronic Industries Association (EIA) Standard RS-222-C. All of the State of Connecticut is within Zone A, requiring towers to withstand 30 psf wind pressure and average extreme velocities of 87 mph. (Hartford 1, p. 12, p. 32)

46. Attached to the top of the proposed towers would be two 11' whip type antennas with 2' mountings on 3' sidearms, adding 13' to the

total height of the tower structures. Three dual 8' reflectorized antennas with 2' mountings on 6' sidearms would be mounted below the top of the tower. The whip antennas would be omnidirectional transmit antennas, while the reflectorized antennas would be receive-only antennas. (Hartford 1, pp. 11-12; Docket 56, Finding 44)

47. A single-story electronics building would be located at the base of a typical tower. These buildings, constructed of concrete or fiberglass, would house receiving, transmitting, switching, processing, and monitoring equipment, as well as a standby power source. Buildings would be approximately 10' in height and contain 350 square feet (ft^2). (Hartford 1, p. 12)

48. The proposed equipment buildings would be unmanned. Typical tower site buildings would have a 12' wide crushed stone driveway and be surrounded by an 8' chain link fence with 12" security wire on top. (Hartford 1, pp. 12-13)

49. As required by the FCC, cellular frequency coordination to avoid interference with the SNET system would be achieved with correct frequency selection, antenna placement, shielding, and filtering. (Hartford 4, Q. 28; Docket 56, Finding 50)

50. Interference between cellular transmission and television reception is very unlikely. (Hartford Late File 10)

51. Motorola has informed Hartford Cellular that, as a general rule, cell tower sites should not be located less than two miles from a full power 50 kilowatt AM broadcast facility due to significant radio frequency interference problems. (Hartford 3, Q. 13; Hartford 15, Q. 47)

52. For the proposed frequency range of 870-890 Mhz, the power density allowable is 2.9 mW/cm^2, according to the American National Standards Institute (ANSI) standard. The electromagnetic radio frequency power densities at all proposed sites would be several orders of magnitude below these standards. Even if the ANSI standards were lowered to one-tenth their present level, all of the proposed tower sites would still be within the standards. (Hartford 1, Exhibit Q; Tr. 5/21/86, p. 136; Docket 56, Finding 53)

53. The proposed Bloomfield tower site is a 45'x85' leased parcel on the ridge of Talcott Mountain, off of Montevideo Road. The title of this land is in dispute. (Hartford 1, Exhibit 9, p. 4, p. 24; Hartford 5, Q. 44; Tr. 4/15/86, p. 22)

54. Located within 400' of the Talcott Mountain Science Center property, within 1200' of the Talcott Mountain Science Center Complex, and within 500' of Talcott Mountain State Park, the proposed Bloomfield site is zoned residential. (Hartford 5, Q. 12, Q. 50; Late File 13)

55. On April 11, 1986, Hartford Cellular submitted a revised site plan for the proposed Bloomfield site, located 200' south of the originally proposed site, 475' from a house now under construction, owned by James Tilney, and within an easement area of the Tilney property. The tower would be 175' from the Wiepert property line. (Hartford 13, Attachment A.; Hartford 5, Q. 48; Tr. 3/18/86, p. 44; Tr. 4/15/86, p. 21; Hartford Late File 19, Exhibit A)

56. Within a 2000' radius of the proposed Bloomfield site, vegetation is variable and consists primarily of 30'-50' deciduous trees. (Hartford 5, Exhibit 4, p. 1)

57. The applicant originally proposed a 180' lattice tower for the Bloomfield site. On May 21, 1986, Hartford Cellular revised its proposed tower height to 100', 113' including antennas. (Hartford 1, Exhibit 9, p. 9; Tr. 5/21/86, pp. 14-15; Hartford Late File 19, Exhibit A)

58. Because of the mountainous terrain, some grading and backfilling would be required at the proposed Bloomfield site. Parking spaces for two vehicles would be required because of the proposed shared use of the facility with the Message Center Beeper Company. (Hartford 1, Exhibit 9, p. 4, p. 15)

59. The lessor of the Bloomfield Talcott Mountain site, Henry Zachs, would initially require three antennas at this site. The company would receive a rental fee for any additional antennas. Mr. Zachs's company, Message Center Beeper Company, does not presently use microwave technology in Connecticut. (Hartford 5, Q. 52, Q. 58)

60. The elevation of the proposed Bloomfield site is 850' above mean sea level (AMSL). The proposed tower would be visible from the towns of Bloomfield and West Hartford, which are located to the east of Talcott Mountain, a regionally prominent ridge line, and from the towns of Avon and Simsbury, which are located to the west of Talcott Mountain. The proposed tower would also be visible from the Talcott Mountain Science Center, located to the north. (Hartford 1, Exhibit 9, p. 5, p. 12; Hartford 5, Exhibit 4; DEP letter of 3/6/86)

61. There is a small private tower on the Wiepert property, estimated as 100' in height, which is adjacent to the proposed Bloomfield site. (Tr. 3/18/86 pp. 73-74; pp. 120-121)

62. Construction of the proposed Bloomfield tower is opposed by the Talcott Mountain Science Center, the Bloomfield Planning and Zoning Commission, and the DEP. The Science Center expressed concern about possible obstruction of its astronomical observations, by a 180' tower. The Bloomfield Planning and Zoning Commission prefers to leave the Talcott Mountain ridge line in its natural state, and the DEP believes the proposed tower would create aesthetic and land use conflicts. (Talcott Mountain Science Center letter of 3/18/86; DEP letter of 3/6/86; Tr. 3/18/86, pp. 118-119)

63. A 20'x20' equipment building would be constructed at the base of the proposed Bloomfield tower. (Hartford 1, Exhibit 9, p. 13)

64. Based on conservative assumptions, operating at 100 watts, the power density for the proposed Bloomfield site would be 0.0060718 mW/cm^2 at the base of the proposed tower. (Hartford 1, Exhibit Q.)

65. Regarding possible alternate sites, Hartford Cellular investigated the nearby radio tower WTHT and Heublein tower but was informed they are not available for shared use. The radio station WCCC tower was investigated, but preliminary analysis indicated inadequate structural strength and the applicant was unable to reach an economically feasible arrangement with the tower owner. The applicant also investigated possible sharing of the DEP tower to be constructed in the area, but determined that such a shared use would require an increase in the intended 60' height of this tower. (Docket 24, Finding 12; Hartford 3, Q. 13; Hartford 5, Q. 45, Q. 46; Tr. 5/21/86, p. 152)

66. There are 13 existing towers, within 3 miles of the proposed Bloomfield site. Those towers located in Avon are a 291' WHCT tower, a 465' WTIC (FM) tower, a 500' WFSB tower, a 100' WWUH (FM) tower, a 465' WEDH TV tower, a 60' DEP tower, a 60' WKNB tower, and a 435' WTIC (AM) tower. Towers located in Bloomfield include a 347' WCCC tower, an 80' RAFS tower, a 100' Department of Motor Vehicles tower, and an 80' Federal Bureau of Investigation tower. The 165' Heublein tower is in Simsbury. (Hartford 5, Q. 45)

67. A potential site proposed by the Town of Bloomfield Assessor on St. Andrews Road was investigated by the applicant, but this site did not meet the company's coverage objectives. This site would shield coverage on the Avon side of Talcott Mountain, and therefore another tower would be required to cover the Avon-Farmington area. (Tr. 4/15/86, pp. 31-32, pp. 54-55)

68. The proposed Glastonbury site is an existing 220' guyed lattice communications tower on a parcel of land off of Birch Mountain Road. The tower is owned by Michael Gassner Electrical Contractors Inc., of West Hartford. (Hartford 1, Exhibit 5, p. 1, p. 4)

69. The proposed transmit antennas would be base mounted at the 178' level of this tower, while the receive antennas would be base mounted at the 167' level. (Hartford 1, Exhibit 5, p. 7)

70. The proposed Glastonbury site is 870' AMSL, and utilities are present as is an access roadway. A 15'x22' equipment building would be constructed at the base of the existing tower. (Hartford 1, Exhibit 5, p. 4, p. 9A, p. 11; Hartford 5, Q. 32)

71. Based on conservative assumptions, the power densities for the proposed Glastonbury site would be 0.0034696 mW/cm^2 at 100 watts, at the

180' level of the tower. (Hartford 1, Exhibit Q)

72. Other towers on land adjacent to the proposed Glastonbury tower are a 146' AT&T Long Lines tower, a 120' SNET tower, a 70' DEP tower, a 120' DEP tower, and a 120' Department of Transportation tower. (Hartford 1, Exhibit 5, p. 6)

73. The proposed Haddam site is a 100'x100' parcel of land owned by Jack and Jacqueline Michael on Turkey Hill Road Zoned residential, but is within an automobile salvage yard. (Hartford 1, Exhibit 1, p. 1, p. 5)

74. The proposed Haddam site is 500' AMSL and is surrounded by deciduous trees. Utilities would be brought in above ground 450' from Plains Road. (Hartford 1, Exhibit 1, p. 6, p. 15, p. 23)

75. The proposed Haddam tower would be a lattice tower 180' in height, 193' including antennas. A 15'x21' equipment building would be constructed at the base. (Hartford 1, Exhibit 1, p. 10, p. 14)

76. The proposed Haddam site is within a right-of-way presently under dispute. The proposed tower would be located approximately 150' from the nearest property line, and therefore might be moved south another 20' by the applicant. (Tr. 4/17/86, p. 144; Tr. 5/21/86, p. 31).

77. The proposed Haddam tower would be visible from the intersection of Ranger Road and Beaver Meadow Road. Approximately the top 40' of the proposed tower might be visible 2½ miles away from the Goodspeed Opera House and from the East Haddam National Register Historic District. (Hartford 5, Exhibit 4; Tr. 5/21/86, p. 93; Hartford Late File 24)

78. The applicant is exploring potential tower sites north of the proposed Haddam site to compensate for an expected coverage gap along Route 9. Hartford Cellular anticipates the need for a tower in the

Middletown area. (Hartford 18, Q. 3)

79. Hartford Cellular cannot reduce the height of the proposed Haddam tower from 180' without losing coverage along Route 9. The proposed Haddam site is one of a group which would provide coverage along Routes 9 and 95 and would interface with an expected Old Saybrook site. (Tr. 5/21/86, pp. 94-98)

80. The applicant has assumed responsibility for constructing and financing a new access road, should it be required at the proposed Haddam site. (Tr. 5/21/86, p. 154)

81. Based on conservative assumptions, power densities at the proposed Haddam site would be 0.0034696 mW/cm^2 at the base of the proposed tower, operating on 100 watts of power. (Hartford 1, Exhibit Q)

82. The proposed Hartford site would be located on the rooftop of an existing building at One State Street owned by Gerald D. Hines Interests and the Hartford Steam Boiler Inspection and Insurance Company. The proposed antennas would be attached to the penthouse on the roof, 300' above ground level (AGL). (Hartford 1, Exhibit 8, pp. 1-2; Hartford 2, Q. 17)

83. The proposed receive antennas would be mounted below the top of the high point of the building. The two proposed whip type transmit antennas would be located 13' above the penthouse facade. The penthouse facade is set back 10' from the overall building facade. Only the two transmit antennas might be visible from nearby streets. (Hartford 1, Exhibit 8, pp. 1-2; Hartford 2, Q. 6)

84. There is one antenna presently at the proposed Hartford site, operated by T-Com Company for paging services. (Hartford 2, Q. 6)

85. The applicant's associated cellular equipment would be in the existing penthouse at the proposed Hartford site. Utilities are present. (Hartford 1, Exhibit 8, p. 2; Hartford 5, Q. 32)

86. Based on conservative assumptions, power densities at the proposed Hartford site would be 0.00184809 mW/cm^2, (Tr. 3/18/86, p. 23; Hartford 4, Q. 30)

87. The proposed Middlefield site is a 75'x75' leased parcel off of Palisades Road on top of Beseck Mountain. The proposed site is owned by Howard McAuliffe of Middletown, Connecticut. (Hartford 1, Exhibit 3, p. 1, p. 4)

88. The proposed Middlefield site is zoned HO-Residential. The proposed tower would be shared with the lessor, a provider of commercial radio service. The lessor would construct a separate communications equipment building, adjacent to the proposed tower, to contain his communications equipment. The applicant has no knowledge of the prospective lessor's actual plans regarding this building, but anticipates this building of undetermined size would be built at the base of the proposed tower. (Hartford 1, Exhibit 3, p. 4; p. 15; Hartford 5, Q. 19)

89. Hartford Cellular would construct a 15'x21' equipment building near the base of the proposed Middlefield tower. (Hartford 1, Exhibit 3, p. 13)

90. Hartford Cellular had originally proposed a 180' lattice tower for the proposed Middlefield site, but on April 17, 1986, reduced the proposed tower height to 130'. (Hartford 1, Exhibit 3, p. 9; Tr. 4/17/86, p. 64)

91. The proposed Beseck Mountain site is 750' AMSL. Beseck Mountain is part of a regionally prominent ridgeline, and the proposed site is the highest point in Middlefield. Hikers on the Mattabassett Trail use Beseck Mountain to obtain scenic views over the area. (Hartford 1, Exhibit 3, p. 14; Tr. 4/17/86, p. 50; Middlefield 2, p. 14; DEP letter of 3/6/86)

92. The proposed tower would violate Middlefield zoning regulations regarding the construction of towers on ridgelines. These regulations, adopted in 1974, require towers to conform to tree lines along ridge tops. (Middlefield 1, p. 28; Tr. 5/21/86, pp. 59-60)

93. Hartford Cellular did not research any literature regarding ridgelines when investigating the proposed Middlefield site. (Tr. 4/17/86, pp. 111-113)

94. The proposed Middlefield site is the only proposed site outside of the company's search area. (Hartford 5, Exhibit 1, Q. 7, pp. 1-10)

95. There are approximately 50 residences located within 2000' of the proposed Middlefield tower site. The proposed tower would be 250' north of the 75' SNET tower. The SNET tower site is 778' AMSL, 28' higher than the proposed Hartford Cellular site. Four other towers located on this ridge are a 30' tower owned by Connecticut Public Broadcasting, a 20' utility pole owned by Message Center Beepers, a 30' utility pole owned by Valley Oil Company, and a 25' mast owned by Valley Oil Company. (Hartford 5, Exhibit 4; Hartford 5, Q. 19; Docket 40, Finding 127)

96. The towns of Meriden and Middlefield both oppose the location of the Middlefield tower as proposed. The Town of Meriden objects to

the proposed site on aesthetic grounds, and the Town of Middlefield opposes the location, size, and design of the proposed tower. (Meriden Planning Commission letter of 2/28/86; Town of Middlefield letter of 3/17/86; Middlefield 4)

97. The proposed Middlefield tower would be visible from the town of Middlefield to the east and Meriden to the west. It would also be visible from the intersection of Beseck Lake Road and West Road, from Spice Apple Lane, and from the intersection of High Hill Road and Wildwood Road. (Hartford 1, Exhibit 3, p. 5; DEP letter of 3/6/86; Hartford 5, Exhibit 4)

98. Another Middlefield site, a 610' elevation south of a transmission line off of Route 66, was analyzed for coverage but was not investigated for availability by the applicant. A 180' tower at this location would result in a significant loss of coverage along roads to the north and southwest. If this site were used instead of the proposed Beseck Mountain site, an additional cell site would be needed in the Wallingford area. (Hartford 18, Q. 60)

99. Hartford Cellular is negotiating with the Connecticut State Police regarding the potential sharing of a proposed tower in Middlefield. (Tr. 4/17/86, p. 64)

100. The applicant would be agreeable to negotiating with the Town of Middlefield for an alternate site. (Tr. 4/17/86, pp. 55-56)

101. Based on conservative assumptions, power densities at the proposed Middlefield site would be 0.0039033 mW/cm^2 at 100 watts at the tower base. (Hartford 1, Exhibit Q)

102. The proposed Portland site is a 60'x60' leased parcel on Goodrich Lane property owned by Terence Newbury of Portland. (Hartford 1, Exhibit 4, pp. 1-3)

103. The proposed site in Portland is 320' AMSL and is set back 170' from Goodrich Lane. The proposed site is surrounded by trees and zoned Rural Residential. (Hartford 1, Exhibit 4, pp. 3-4, pp. 13-14)

104. The proposed Portland tower would be a 160' lattice tower, with 13' additional for antennas, totaling 173'. A 15'x21' equipment building would be located at the base of the proposed tower. (Hartford 1, Exhibit 4, p. 8, p. 12)

105. In compliance with the lessor's wishes, utilities would be brought into the proposed Portland site underground. (Hartford 1, Exhibit 4, p. 3)

106. The proposed Portland tower would be visible from Old Marlborough Turnpike. It would not be visible from Wilcox Road Extension or Coxs Road. The proposed site is 2000' from Meshomasic State Forest. (Hartford 5, Exhibit 4; Hartford 5, Q. 20)

107. Hartford Cellular was refused a request to share an existing SNET tower in Portland. (Hartford 1, Exhibit 4, p. 19)

108. Based on conservative assumptions, power densities at the proposed Portland site would be 0.0049386 mW/cm^2 at 100 watts at the tower base. (Hartford 1, Exhibit Q; Tr. 4/17/86, p. 62)

109. The proposed Rocky Hill site is a 50'x100' leased parcel of land owned by Charles W. Bevier of Portland located 900' north of France Street within property used by the School of Swimming. (Hartford 1, Exhibit 2, pp. 3-4)

110. The proposed Rocky Hill site is zoned R-40 Residential and is within 350' of an existing transmission line. The elevation of the proposed site is 200' AMSL. (Hartford 1, Exhibit 2, pp. 3-4, pp. 13-14)

111. Hartford Cellular would construct a monopole at the proposed Rocky Hill site. The monopole would be 140' in height, a reduction from the original 175'. (Hartford 1, Exhibit 2, p. 8, p. 11; Hartford 2, Q. 2; Tr. 4/17/86, p. 63)

112. A 15'x21' equipment building would be constructed at the base of the proposed Rocky Hill tower. The only structure presently within the drop zone of the proposed tower is a tool shed. (Hartford 1, Exhibit 2, p. 3, p. 12)

113. The applicant investigated a site on Vexation Hill and a SNET tower in Berlin. The Vexation Hill site was rejected due to high residential development in the area. The SNET tower is too short. (Hartford 1, Exhibit 2, p. 22)

114. The proposed Rocky Hill tower would be visible from certain areas along France Street. The proposed monopole would resemble the existing monopole structures of the electric transmission line between the proposed site and France Street. The proposed tower would also be visible from the intersection of Route 160 and New Road and from the intersection of Ten Rod Highway and France Road. (Hartford 1, Exhibit 2, pp. 3-4; Hartford 5, Exhibit 4)

115. The applicant was not willing to propose monopoles at any of the proposed sites other than Rocky Hill, citing expense, twist and sway problems, and the single purpose use of monopoles. (Hartford 15, Q. 52)

116. Based on conservative assumptions, the power densities at the proposed Rocky Hill site would be 0.004337 mW/cm^2 at 100 watts at the base of the tower. (Hartford 1, Exhibit Q)

117. The proposed Somers site is a 100'x100' leased parcel of land located off of Pioneer Heights Road, owned by Clarence D. Farnham of Somers. The proposed site is zoned Residential A-1 and is in agricultural use. (Hartford 1, Exhibit 10, pp. 1-3)

118. The elevation of the proposed Somers site is 400' AMSL. The lattice tower was originally proposed to be 180' in height, but has since been revised by the applicant to 160'. (Hartford 1, Exhibit 10, p. 8, p. 14; Tr. 4/17/86, p. 63)

119. A 15' x 21' equipment building would be constructed near the base of the proposed Somers tower. (Hartford 1, Exhibit 10, p. 12)

120. The applicant investigated and rejected several alternate sites in the Somers area. A hilltop area one mile northwest of the Ellington airport was rejected due to a high degree of residential development and proximity to Ellington airport. The Friedman property on Green Road was rejected due to inaccessibility of the site, low elevation, and long utility runs. The Fox property on Pioneer Heights Road was rejected for lack of adequate space. (Hartford 1, Exhibit 10, p. 21)

121. The proposed Somers tower would be partially visible from Pioneer Heights Road and from Pinney Road. (Hartford 5, Exhibit 4; Tr. 4/15/86, p. 63)

122. Based on conservative assumptions, the power density at the proposed Somers site would be 0.0030359 mW/cm^2 at 100 watts at the base of the tower. (Hartford 1, Exhibit Q)

123. The proposed Vernon site is a 60'x60' leased parcel of land 350' south of South Street owned by the Connecticut Water Company. (Hartford 7, Exhibit 6, pp. 1-3)

124. The proposed Vernon tower would be approximately 250' from the base of an existing 80' Connecticut Water Company water tank. No future water tanks are planned for the proposed site. The proposed tower would be approximately 300' from the nearest occupied dwelling. (Tr. 5/21/86, pp. 130-133)

125. The proposed Vernon site has an elevation of 620' AMSL and is zoned R-22, single family residential. (Hartford 7, Exhibit 6, p. 6, p. 14)

126. With antennas, the proposed Vernon 160' lattice tower would reach 173'. A 15'x21' equipment building would be constructed near the base of the proposed tower. (Hartford 7, Exhibit 6, p. 8, p. 12)

127. The proposed Vernon tower would be visible from the intersection of South Street and Janet Lane, from the intersection of Vernon Avenue and High Street, from the intersection of South Street and Henry Parkway, and from Middle Terrace. Very limited visibility would be obtained from Knollwood Drive. (Hartford 16, Q. 24; Tr. 5/21/86, pp. 131-133)

128. The applicant investigated two alternate sites off of South Street on properties adjacent to the proposed Vernon tower site, but the owners of these properties were not interested in leasing. (Hartford 7, Exhibit 6, p. 21; Hartford 18, Q. 66, Exhibit 1)

129. Based on conservative assumptions, the power density at the proposed Vernon site would be 0.0038411 mW/cm^2 at 100 watts at the base of the tower. (Tr. 4/17/86, p. 62)

130. The proposed Willington tower site is a 100'x100' leased parcel of land on Whifford Hill owned by Martin Drobney of Cosgrove Road. (Hartford 1, Exhibit 11, p. 1, p. 5)

131. The nearest residence to proposed Willington site is owned by the lessor, and is 600' southeast of the proposed site. The nearest off-site residence is 300' away. (Hartford 1, Exhibit 11, p. 5)

132. The proposed Willington site is within a wooded area located 950' AMSL. The proposed site is zoned R-80 Residential. (Hartford 1, Exhibit 11, p. 6, pp. 15-16)

133. The proposed Willington tower was originally proposed to be 180' in height. On April 17, 1986, Hartford Cellular reduced the proposed lattice tower's height to 140'. A 15'x21' equipment building would be constructed near the base of the proposed tower. (Hartford 1, Exhibit 11, p. 10, p. 14; Tr. 4/17/86, p. 65)

134. The proposed Willington tower would be visible from portions of Cosgrove Road, but not from Ruby Road. (Hartford 5, Exhibit 4; Tr. 4/15/86, p. 63)

135. Hartford Cellular investigated property owned by Mrs. Jenkins on Whifford Hill, but the owner was not interested in leasing. (Hartford 1, Exhibit 11, p. 23)

136. Based on conservative assumptions, power densities at the proposed Willington site, would be 0.0030359 mW/cm^2 at the base of the proposed tower, based on conservative assumptions. (Hartford 1, Exhibit Q)

137. The proposed Windsor tower site is a 418'x310'x175'x365' leased parcel of land north of Pigeon Hill Road, owned by Roger Ball of Windsor. (Hartford 17, Exhibit 7A, p. 1, p. 3)

138. The proposed Windsor site is Zoned I-1, Industrial, and is presently a vacant grassy lot 170' AMSL. (Hartford 17, Exhibit 7A, p. 3, p. 13)

139. The proposed Windsor lattice tower would be 160' in height, 173' including antennas. The applicant is negotiating with the Town of Windsor to share the proposed tower for municipal use, such as public safety radio communications. The municipal use is expected to involve five antennas at the 130'-140' level of the proposed tower. (Hartford 17, Exhibit 7A, p. 13; Hartford 17, pp. 3-4)

140. The proposed Windsor site would include a 4000 ft^2 MTSO building. The building would require sanitation facilities and a parking lot for ten vehicles. This MTSO is needed for system operation and for interconnection with SNET's public-switched landline telephone network. (Hartford 1, pp. 12-13, p. 19; Hartford 17, pp. 3-4)

141. A seven kW generator to supply back-up power for the proposed Windsor MTSO would be located near the proposed tower. The generator would be fueled by diesel or propane. (Tr. 5/21/86, p. 134)

142. The proposed Windsor tower would be visible from selected points along Pigeon Hill Road and Addison Road. (Hartford 17, Exhibit A,. p. 4)

143. Based on conservative assumptions, operating at 100 watts, the power density at the proposed Windsor site, would be 0.007312 mW/cm^2 at the tower base. (Hartford Late File 20)

144. Hartford Cellular has not yet received a response from the Federal Aviation Administration (FAA) regarding obstruction marking and lighting for the proposed Vernon and Windsor towers. The FAA has

notified the applicant that obstruction marking and lighting would not be required at any of the other proposed tower sites. (Hartford 2, Q. 5; Tr. 5/21/86, p. 156; Hartford Late File 23)

145. Even if the ANSI power density standards were lowered to one-tenth their present levels, all of the proposed towers would still meet these standards. (Hartford 1, Exhibit Q; Tr. 5/21/86, p. 136)

146. Changes in the originally proposed tower sites and tower heights would still allow Hartford Cellular to cover between 85-90% of the NECMA. (Tr. 4/17/86, p. 95)

147. No known rare, endangered, or threatened species or critical habitats would be affected by the construction of the proposed tower sites. (Hartford 1, Exhibit K; Hartford Late File 24, Exhibit D)

148. The construction of the proposed tower sites would have no substantial effect on the architectural, historical, or archaeological resources listed on or eligible for the National Register of Historic Places, except for the visibility of the proposed Haddam tower from 2½ miles away in East Haddam. (Hartford Late File 24, Exhibit E, Exhibit H)

149. The applicant provided coverage maps of the Hartford NECMA proposed sites to illustrate the characteristics of a cellular system. One indicates the extent of geographic coverage in square miles, and the other indicates the quality of coverage in areas of noisy or non-existent transmissions within a cell's individual coverage area. These maps indicated coverage areas for towers of 140', 160', and 180'. (Hartford 5, Q. 23, Exhibit 2)

150. The company designed its proposed system to provide high quality coverage. The coverage maps depict the farthest reaches of the expected reliable coverage by each cell, and do not depict coverages within the outer boundaries. Changes in tower height would produce changes in coverage that are not indicated. (Hartford 5, Q. 23, Exhibit 2)

151. Since the application does not include any point-to-point facilities, the applicant did not conduct any point-to-point studies concerning intertower, line of sight connections between the proposed tower sites at antenna heights. Propagation studies conducted by the applicant indicated line-of-sight technology is not technically significant for cellular systems. (Hartford 4, Q. 34)

152. The numbers of channels to be provided by each proposed cell site are

Bloomfield,	14;
Glastonbury,	8;
Haddam,	8;
Hartford,	11;
Middlefield,	9;
Portland,	9;
Rocky Hill,	10;
Somers,	7;
Vernon,	7;
Willington,	7;
Windsor,	unknown.

(Hartford 5, Q. 55)

153. Based upon projections included in the original 1983 applications for FCC authorizations to construct and operate cellular telephone systems in the Hartford NECMA, the number of subscribers to wireline and non-wireline cellular service in the Hartford NECMA by 1990 would be 9,000-10,000 subscribers. For proprietary reasons, Hartford Cellular declined to predict customer numbers for 1990. (Hartford 4, Q. 31)

154. Total original costs of constructing the initial Hartford NECMA system were estimated as follows:

Radio and electronics,	$2,198,082.00;
Towers and antennas,	$ 784,800.00;
Utilities,	$ 105,800.00;
Equipment shelters,	$ 796,400.00;
Miscellaneous (including engineering, site preparation, and fencing)	$1,870,400.00;
Total construction and installation	$5,755,482.00.

(Hartford 1, p. 29; Hartford 4, Q. 36)

155. Total cost to construct the revised proposed Hartford NECMA system, including the Vernon tower not included originally, would increase by $306,811.00 to $6,062,293.00. (Hartford 22, Exhibit C; Hartford 4, Q. 36)

156. The addition of the proposed Windsor site and the withdrawal of the Bloomfield (R) site produces no change in total system construction costs. (Hartford 22, Exhibit C)

157. The estimated construction costs for the withdrawn Bloomfield (R) site would have totaled $1,803,941.00 for construction, site preparation, office and MTSO construction, and equipment. (Hartford 1, Exhibit 7, p. 10)

158. The original estimated construction cost for the proposed Bloomfield (RQ) site included:

Radio equipment,	$302,364.00;
Tower and antenna,	$105,900.00;
Utilities,	$ 13,600.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation, and installation),	$ 67,050.00;
Total equipment and construction,	$563,914.00.

(Hartford 1, Exhibit 9, p. 10)

159. Reducing the Bloomfield (CRQ) tower height from 180' to 100' would decrease the cost of its construction by $34,440.00, to $529,474.00. (Hartford 22, Exhibit C)

160. The estimated construction costs for proposed tower-sharing at the Glastonbury site include:

Radio equipment,	$191,338.00;
Antenna and feedline,	$ 25,900.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and cost construction),	$ 50,000.00;
Total equipment and construction,	$349,038.00.

(Hartford 1, Exhibit 5, p. 8)

161. The original estimated construction cost for the proposed Haddam site included:

Radio and electronics equipment,	$191,338.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$425,388.00.

(Hartford 1, Exhibit 1, p. 11)

162. The estimated construction cost for the proposed Hartford site include:

Radio equipment,	$284,223.00;
Antenna,	$ 25,900.00;
Utilities,	$ 6,800.00;
Facility,	$ 20,000.00;
Miscellaneous (including site preparation and installation),	$ 25,000.00;
Total equipment and construction,	$361,923.00.

(Hartford 1, Exhibit 8, p. 5)

163. The original estimated construction cost for the proposed Middlefield site included:

Radio and electronics equipment,	$197,385.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and construction),	$ 67,050.00;
Total equipment and construction,	$431,435.00.

(Hartford 1, Exhibit 3, p. 10)

164. Reducing the Middlefield tower height from 180' to 130' would decrease the cost of construction by $24,710.00 to $406,725.00.

(Hartford 22, Exhibit C)

165. The original estimated construction costs for the proposed Portland site included:

Radio and electronics equipment,	$197,385.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and construction),	$ 67,050.00;
Total equipment and construction,	$431,435.00.

(Hartford 1, Exhibit 4, p. 9)

166. The original estimated construction cost for the proposed Rocky Hill site included:

Radio and electronics equipment,	$278,176.00;
Mast and antenna,	$115,900.00;
Utilities,	$ 13,600.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$549,726.00.

(Hartford 1, Exhibit 2, p. 9)

167. Reducing the height of the mast from 175' to 140' would decrease the cost of constructing the proposed Rocky Hill facility by $20,000.00, to $529,726.00. (Hartford 22, Exhibit C)

168. The original estimated construction cost for the proposed Somers site include:

Radio equipment,	$185,291.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$419,341.00.

(Hartford 1, Exhibit 10, p. 9)

169. Reducing the tower height from 180' to 160' would decrease the cost of constructing the proposed Somers facility by $9,380.00, to $409,961.00. (Hartford 22, Exhibit C)

170. The estimated construction cost for the proposed added Vernon site includes:

Radio equipment,	$185,291.00;
Tower and antennas,	$ 76,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00;
Total equipment and construction,	$410,341.00.

(Hartford 7, Exhibit 6, p. 9)

171. Adding the Vernon proposed facility would increase the total costs of constructing the Hartford NECMA system by $410,341.00. (Hartford 22, Exhibit C)

172. The original estimated construction cost for the proposed Willington site included:

Radio equipment,	$185,291.00;
Tower and antenna,	$ 85,200.00;
Utilities,	$ 6,800.00;
Equipment shelter,	$ 75,000.00;
Miscellaneous (including site preparation and installation),	$ 67,050.00
Total equipment and construction,	$419,341.00.

(Hartford 1, Exhibit 11, p. 11)

173. The estimated construction cost for the proposed added Windsor site includes:

Radio equipment,	$ 185,291.00;
Tower and antenna,	$ 85,200.00;
Standby power,	$ 31,000.00;
Building,	$ 176,400.00;
Miscellaneous (including site preparation, office and MTSO construction and installation),	$1,326,050.00;
Total equipment and construction,	$1,803,941.00.

(Hartford 17, Exhibit 7A, p. 16)

174. The greater estimated radio equipment costs for the proposed Bloomfield, Hartford, and Rocky Hill cell sites are for additional radio channels and related electronics equipment to handle the greater traffic-handling capacity needed in the metropolitan Hartford area. (Hartford 2, Q. 11)

175. The following table indicates the estimated distances from the nearest utility pole to the proposed equipment building and the estimated costs for underground utility lines:

Site	Distance	Cost
Bloomfield (RQ)	100'	$1,250
Glastonbury	Existing Utilities	
Haddam	450'	$3,150
Hartford	Existing Utilities	
Middlefield	100'	$1,000
Portland	250'	$3,750
Rocky Hill	350'	$1,425
Somers	450'	$1,465
Vernon	250'	$2,065
Willington	350'	$1,425
Windsor	170'	unknown*

* Included in miscellaneous costs Exhibit 7A, p. 16

(Hartford 5, Q. 32; Hartford 17, Exhibit 7A, pp. 16, 21; Hartford Exhibit 22, p. 4)

176. The costs of 140', 160', and 180' Valmont monopole masts identical to the one intended for the proposed Rocky Hill facility are as follows:

140 feet,	$42,000.00;
160 feet,	$55,000.00;
180 feet,	$71,000.00.

(Hartford 4, Q. 39)