September: Radio's 25th consecutive month of growth; combined local, national +10%

The *RAB* reports that combined local and national revenues were up 10% in September, marking the industry's 25th straight month of revenue gains. For the year-to-date, the combined local and national growth stands at 11%.

National growth outstripped local growth again. National was up 12% against last year, while local was up 9%. The single weak showing was national spot in the Southwest, which declined a percentage point.

RAB President **Gary Fries** says "There's no sign that this steady growth will taper off any time soon. It looks as though radio may well end the year with a double-digit gain under its belt."

RAB derives the numbers from data on more than 100 markets provided by the acccounting firms of *Miller, Kaplan, Arase & Co.* and *Hungerford, Aldrin, Nichols & Carter.*

Kagan panelists on radio: pump up the upbeat

Here's RBR's report from the Paul Kagan Seminars Inc. session, "Future of Radio: Acquisition and Finance," that was held last Tuesday (10/25) in New York City.

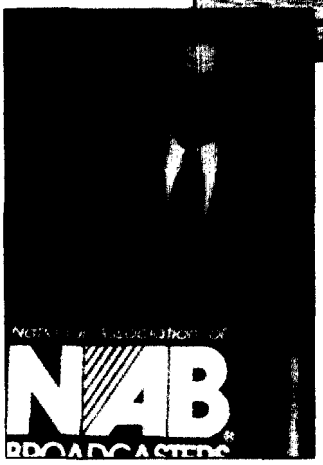
***RBR* analysis:** The general tone among radio-industry bankers, brokers and investors at last week's session was almost euphoric in its optimism about the industry's near-term future. Panelists see plenty of upside for increased advertising revenue, big-deal financing and duopoly consolidation. A few yellow caution flags were raised, however, by those who expect an economic slowdown sometime around mid-1995—and by those who doubt that duopoly combinations necessarily lead to increased revenue and ad rates.

One group head gave this assement: "It's starting to feel like the 1980s again..." Another *RBR* source was more confident about the renewed enthusiasm: "I wouldn't be too worried about 'baby bankers' and short-term memory. A lot of the bankers in charge of the back offices and the loan committees now were here in the 1980s... and they have good memories."

Broadcasters see revenue growth in radio's future

Participants at NAB Radio Show are bullish on the medium

By Donna Petrozzello



Westwood One Radio Networks' G. Gordon Liddy (above) was one of several talk show hosts to broadcast live from the NAB Radio Show. Legendary radio personality and ABC Radio talk show host Paul Harvey (l) was awarded the NAB Spirit of Broadcasting Award and delivered the keynote speech at the Radio Show luncheon.

The National Association of Broadcasters' 1994 Radio Show in Los Angeles offered dialogue on radio ownership limitations, ad revenue and predictions on future radio business from industry leaders.

In the majority of more than 50 panel discussions and workshops, industry leaders supported even further relaxed ownership restrictions beyond the current 20 AM and 20 FM limit imposed by the FCC. The limit was increased from 18 AM and 18 FM properties to 20/20 in September.

"As an industry, I don't know what the rationale is for a 20/20 ownership limit," said Steve Dodge, chairman and CEO of American Radio Systems. "The increase has been tremendously positive, and I don't know why the limits shouldn't be 30 or 40 stations. I hope as a group we're effective in getting some further relaxation of the ownership limits."

Many group leaders agreed the past year has been profitable for station operators, especially in revenue growth.

In his address to broadcasters, Radio Advertising Bureau President and CEO Gary Fries said radio should reach $10.8 billion in gross station revenues by the end of 1994. Fries also predicted gross revenue will surpass $13.5 billion by 1998.

Most group heads and industry insiders agreed the future portends continued revenue growth for radio, at least through the first quarter of 1995.

Strong sources for revenue will include increased television advertising on radio and revenue from the automotive industry. As broadcast and cable television become increasingly fragmented and stations shift in network affiliations, several group heads suggested, television will increase its spending on radio ads.

Likewise, the recently signed law allowing auto advertisers to sidestep the inclusion of a lengthy disclosure statement on radio ads will help draw automotive-leasing advertisers to radio, predicted the radio group owners.

Fries said the slump in the early 1990s ultimately benefited radio

because it forced advertisers to reexamine where they were spending the bulk of their budgets. As a result, Fries said, advertisers are "rethinking how to approach the consumer" and are seeking radio more frequently because of its ability to target specific demographic groups.

Dave Crowl, president of Citicasters Radio Group, expects advertisers also will return to "brand strengthening" advertising and will cease focusing as strongly on promotional radio advertising.

In various panel discussions on the changing attitudes of banks and private equity institutions toward radio, group owners noted that banks and lending institutions, which had shied away from radio in the early 1990s when the industry hit a slump, are coming back. Owners also noted that private equity lenders have emerged, which has benefits and disadvantages.

Bill Lisecky of Communications Equity Associates said banks have resumed lending seven times debt-to-operating cash flow to operators starting new stations. He also said that private equity has "flowed back into the marketplace and is helping entrepreneurial groups to start new companies."

Mark Mays, senior vice president of operations at Clear Channel Communications, said that an increasing number of "equity players" are coming into the radio market. The result, Mays said, has been higher station prices.

ABC Radio introduced its talk show talent to radio executives with a party at the Westin Bonaventure on Oct. 14 during the NAB Radio Show. L-r: James Carney, host of 'Moby in the Morning'; Tom Joyner, host of 'The Tom Joyner Morning Show'; Rick Dees, host of 'The Weekly Top 40 with Rick Dees'; Nanci Donnelion, host of ESPN Radio's 'The Fabulous Sports Babe'; Bob Kingsley, host of 'American Country Countdown with Bob Kingsley,' and Dick Bartley, host of several syndicated oldies programs.

Some group leaders said the higher prices could force owners to find alternate ownership arrangements. Higher prices also could portend disaster for some operators who purchase stations and may not see an adequate return on their investment, group owners predicted.

Frank Wood, president and CEO of Secret Communications, expects more owners will come to operate additional stations through mergers "as a way of short-circuiting temporary high prices."

Others said higher prices have caused operators and group heads to look into forging LMAs and mergers and buying less expensive stations in small markets.

"Operators today are aggressively looking at alternative buying strategies, such as friendly mergers, purchasing in smaller markets, buying companies with their public stock or simply sitting and waiting," Lisecky said.

Some group leaders stressed the need of their colleagues to grow cautiously and wisely with the recent upturn in business, reminding them of lessons learned in the down years suffered by radio in the early 1990s.

Dodge said the industry is "seeing escalations of multiples" and similar debt structures for radio properties now that existed in the late 1980s when station prices soared.

"I think the merger aspect is the next logical step for growth in the industry," Dodge said. "Those of us who are old enough to have lived through a lot of these cycles are a little bit nervous about the outlook for these kinds of deals. So I think there's a lot of cause for caution on the acquisition side of the business now."

However, Mays said, "If there is a train wreck coming, it's that the equity players will get a slightly reduced return on their money but will still get a good return over the next three to five years." ■

Fries "States of Sales" address: "Farm, don't hunt"

RAB president **Gary Fries**, speaking at the NAB Radio Show last week, urged the industry to plant sales seeds, and "farm," instead of the widespread "hunt, kill and make budget" approach to sales. Farmers plant seeds, watch them grow, and then reap the rewards, said Fries. Hunters go for the quick killing of all possible targets.

"Never has there been a finer hour; never has there been more opportu-

nity in radio," said Fries, but only if radio's salespeople and sales managers learn to be marketers instead of spot peddlers. Fries urged broadcasters to forge "marketing relationships" with advertisers. "We need to be as intimate with our advertisers as we are with our consumers (listeners)."

Fries urged owners and managers, especially in large markets, to bypass the traditional agency relationships and develop marketing relationships with the owners and top execs at each advertiser. Fries urged the industry to think in terms of how radio can move product instead of selling radio spots.

Fries said radio already has a head start down the information highway since it is already highly targeted, an asset which "maps the off-ramps on the superhighway." Fries also questioned the costs involved with some of the more ambitious "information highway" schemes. "Who's going to give consumers the money to use it?" he asked, quickly adding, "Consumers are going to say, 'I like my free radio.'"

Fries predicted Radio will outperform some of the most optimistic economic projections in 1994 to end the year with revenues of $10.8 Billion.

Radio group owners see bright future for radio

Five industry leaders echoed the theme that radio is on a roll that could continue for at least two more years. The forum for this good news was *CEA*'s Radio Financial Breakfast, Thursday's unofficial opening of the NAB Radio Show. The all-star line-up included **Frank Wood**, President/COO *Secret Communications*, **Steve Dodge** Chairman/CEO, *American Radio Systems*, **Herb McCord**, President/CEO of *Granum Communications*, **Dave Crowl**, Radio Group President of *Citicasters* and **Mark Mays**, Senior VP of *Clear Channel*.

All five panelists were bullish on the industry and predicted the new growth in radio groups would be true mergers, now that duopoly is well entrenched. This was sparked by the general feeling that, although equity and bank debt at reasonable rates are again available for radio acquisition, sale-price cash multiples may be getting out of line. As McCord put it, "It's a great time to be an operator, but I'm not so sure it is the time to buy. It's tough to do realistic deals." "Just say no to 11-times deals," said Dodge.

From which areas do these operators see increased or new radio dollars?

Auto leasing; TV stations, as network affiliations change; movement of promotional dollars back into general advertising budgets by package goods marketers

What concerned them most about radio's future?

Regulators may be ready to step in when times are good. Don't slip into bad expense control habits. Don't depend excessively on syndicated product. With money available, resist the urge to try to finance deals like in the 1980s.

***RBR* observation:** Radio has profited by its successes in duopoly and seems to have learned from its mistakes, but the panel was concerned about memory lapses. Mark Mays put it best, "I don't see a train wreck coming, but the signs for caution are out there."

In annual "State of the Industry" report, Fritts was very bullish on future of free TV and radio: "This has been one great year for our industry... Not only are our advertising revenues up, but our audiences are as well... We are on a roll for a banner year" in 1994. He expressed "renewed optimism and excitement about our future." He said broadcasting -- "here today -- is the most convenient 'on-ramp' for tomorrow's information highway. The opportunities for our industry abound."

APPENDIX E

Rules proposed in the *NPRM* red-lined to conform to CD Radio's comments

APPENDIX E

Proposed rules in the *NPRM* "red-lined" to reflect CD Radio's Comments

1. The Table of Contents for Part 25 is revised to read as follows:

PART 25 - SATELLITE COMMUNICATIONS

Subpart A - General

Subpart B - Applications and Licenses

EARTH STATIONS

SPACE STATIONS

PROCESSING OF APPLICATIONS

FORFEITURE, TERMINATION, AND
REINSTATEMENT OF STATION AUTHORIZATION

Subpart C - Technical Standards

Subpart D - Technical Operations

Subpart E - Developmental Operations

Subparts F-G - [Reserved]

Subpart H - Authorization to own stock in the Communications Satellite Corporation

Subpart I - Equal Employment Opportunities

2. The authority citation for Part 25 continues to read as follows:

AUTHORITY: Sections. 101-404, 76 Stat. 419-427; 47 U.S.C. 701-744, Sec. 4, 48 Stat. 1066, as amended; 47 U.S.C. 154. Interprets or applies sec. 303, 48 Stat 1082, as amended; 47 U.S.C. 303.

3. Section 25.114 is amended by revising paragraph (c)(18), to read as follows:

§ 25.114. Applications for space station authorizations.

(c)

(18) Detailed information demonstrating the financial qualifications of the applicant to construct and launch the proposed satellites. Applications for domestic fixed-satellite systems and mobile-satellite systems shall provide the financial information required by § 25.140(b)-(e), § 25.142(a)(4), or § 25.143(b)(3), as appropriate. Applications for satellite DARS systems shall comply with the requirements of § 25.144(b)(3). Applications for international satellite systems authorized pursuant to Establishing of Satellite Systems Providing International Communications, 50 FR 42266 (October 18, 1985), 101 FCC 2d 1046

(1985), recon, 61 RR 2d 649 (1996), further recon., 1 FCC Rcd 439 (1986), shall provide the information required by that decision.

4. A new Section 25.144 is added to read as follows:

§ 25.144 Licensing provisions for the 2.3 GHz satellite digital audio radio service.

(a) Definitions

(1) "System" The term "System" refers to the constellation of one or more satellite DARS space stations, the feeder link earth station(s), the mobile, and fixed and/or portable receivers, and telemetry, tracking and control facilities.

(2) "Allocated bandwidth." The term "allocated bandwidth" refers to the entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services ~~or the radio astronomy service under specified conditions~~. This term shall be applied to the 2310-2360 MHz band for satellite DARS.

(3) "Frequency Assignment." The term "frequency assignment" refers to the authorization given by the Commission for a radio station to use a radio frequency or radio frequency channel under specified conditions.

(b) Qualification Requirements:

(1) General Requirements: Each application for a system authorization in the satellite digital audio radio service in the 2310-2360 MHz band shall describe in detail the proposed satellite digital audio radio system, setting forth all pertinent technical and operational aspects of the system, and the technical, legal, and financial qualifications of the applicant. In particular, satellite DARS applicants must file information demonstrating compliance with § 25.114 and all of the requirements of this section.

(2) Technical Qualifications: In addition to the information specified in (b)(1), each applicant shall:

(i) identify the service link margin of its satellite DARS system for ~~and demonstrate that its system will, in a mobile environment under clear sky~~

~~conditions, provide that service link margin to~~ the geographical areas it intends to serve;

(ii) demonstrate that its satellite DARS system ~~is capable of remotely tuning its individual mobile, fixed, and/or portable receivers across the allocated bandwidth 2310-2360 MHz and demonstrate how it will implement the forward signalling command for its receivers to select and tune to any center frequency(ies) in the allocated bandwidth~~ includes a receiver design that permits users to access all operational satellite DARS systems;

(iii) identify the ~~coding scheme and coding~~ compression rate it will use to transmit ~~CD quality~~ audio programming. If applicable, the applicant shall identify any other audio format(s) it will provide to its end users as well as their associated ~~coding scheme and coding~~ compression rates. ~~If audio formats which are less than CD quality will be provided, it shall demonstrate that it is capable of transmitting those audio formats at variable data rates which are less than those necessary to produce CD quality audio;~~

(3) Financial Qualifications:

(i) Each applicant for a space station system authorization in the 2.3 GHz satellite digital audio radio service must demonstrate, on the basis of a detailed business plan, how it proposes to meet the estimated costs of the construction and launch of its proposed space station(s) and the estimated operating expenses for one year after the launch of its space station(s).

(ii) Within one year of license grant, licensees are required to demonstrate full financing of their systems in the form specified in §§ 25.140(c) and (d). In addition, applicants relying on current assets or operating income must submit evidence of a management commitment to the proposed satellite system. Failure to make such a showing will result in the dismissal of the application.

(c) Milestone Requirements.

(1) Each applicant for system authorization in the satellite digital audio radio service must demonstrate within 10 days after a required implementation milestone as specified in the system authorization, and on the basis of the documentation contained in its application, certify to the Commission by

affidavit that the milestone has been met or notify the Commission by letter that it has not been met. At its discretion, the Commission may require the submission of additional information (supported by affidavit of a person or persons with knowledge thereof) to demonstrate that the milestone has been met. This showing shall include all information described in 25.140 (c), (d) and (e) of this part. The satellite DARS milestones are as follows, based on the date of authorization:

(i) One year: Complete contracting for construction of first space station or begin space station construction.

(ii) Two years: If applied for, complete contracting for construction of second space station or begin second space station construction.

(iii) Four years: In orbit operation of at least one space station.

(iv) Six years: Full operation of the satellite system.

(d) Reporting requirements. All operators of satellite digital audio radio service systems shall, on June 30 of each year, file a report with the International Bureau and the Commission's Laurel, Maryland field office containing the following information:

(1) Status of space station construction and anticipated launch date, including any major problems or delay encountered;

(2) A listing of any non-scheduled space station outages for more than thirty minutes and the cause(s) of such outages;

(3) Identification of any space station(s) not available for service or otherwise not performing to specifications, the cause(s) of these difficulties, and the date any space station was taken out of service or the malfunction identified.

(e) Modification of station license for complementary terrestrial broadcasting service in the satellite digital audio radio service. Licensees in the satellite digital audio radio service may construct and operate terrestrial transmitters to retransmit signals received from operating satellite DARS systems on the same frequency and using the same bandwidth as the satellite space station(s) without obtaining prior Commission approval. Prior FCC authorization is required in the following circumstances:

(1) International coordination. A transmitter is located within 68 kilometers of the Canadian or Mexican borders or otherwise requires prior coordination with adjacent country co-frequency systems.

(2) Antenna structure clearance required. A transmitter whose construction or alteration would exceed the requirements of § 17.7 of this chapter.

(3) Environmental. A transmitter that has a significant environmental effect as defined by §§ 1.1301 through 1.1319 of this chapter.

6. A new paragraph is added, in alphabetical order Section 25.201 to read as follows (addition of this paragraph to Section 2.1 is consequential):

§ 25.201 Definitions

Satellite Digital Audio Radio Service ("DARS"). A radiocommunication service in which ~~compact disc quality~~ audio programming is digitally transmitted by one or more space stations directly to fixed, mobile, and/or portable stations, and which may involve complementary terrestrial broadcast service.

7. Section 25.202 is amended by adding a new paragraph (a)(6), as follows:

§ 25.202. Frequencies, frequency tolerance and emission limitations.

(a)

(6) The following frequencies are available for use by the satellite digital audio radio service:

2310-2360 MHz: space-to-Earth (primary)

8. A new Section 25.214 is added to read as follows:

§ 25.214. Technical requirements for space stations in the satellite digital audio radio service.

(a) Each system authorized under this section will be conditioned upon construction, launch and operation milestones as outlined in Section 25.144(c). The failure to meet any of the milestones contained in an authorization will result in its cancellation, unless such failure is due to circumstances beyond the

licensee's control or unless otherwise determined by the Commission upon proper showing by the licensee in any particular case.

(b) Frequency assignments will be made for each satellite DARS system as follows:

(1) All licensees are limited to the allocated bandwidth of 2310-2360 MHz.

(2) The allocated bandwidth will be divided into four 12.5 MHz frequency assignments: 2310.0-2322.5 MHz; 2322.5-2335.0 MHz; 2335.0-2347.5 MHz; and 2347.5 MHz-2360.0 MHz. ~~[Subject to Decision – Band Segments]~~

(3) Unless the licensees agree otherwise, each licensee shall be assigned the highest frequency assignment remaining available on the date that it certifies that it has met the first satellite DARS milestone. ~~[Subject to Decision – Frequency Assignments]~~

(4) ~~Each satellite DARS licensee shall reduce its assigned bandwidth occupancy by 0.1 MHz to create two (2) 0.2 MHz assignments adjacent to the edge of the allocated bandwidth for location of telemetry beacons.~~ Satellite DARS licensees may reduce their assigned bandwidth occupancy to provide telemetry beacons.

(5) Each licensee may employ cross polarization within its exclusive frequency assignment and/or may employ cross polarized transmissions in frequency assignments of other satellite DARS licensees under mutual agreement with those licensees. Licensees who come to mutual agreement to use cross-polarized transmissions shall apply to the Commission for approval of the agreement before coordination is initiated with other administrations by the licensee of the exclusive frequency assignment.

(6) No satellite DARS licensee may combine spectrum or services with another satellite DARS licensee where the effect of such action would be to aggregate the frequencies available to each.

APPENDIX II

Proposed Rules and Regulations to be Added to
47 C.F.R. Part 87 of the Commission's Rules

PART 87 - AVIATION SERVICES

1. The authority citation in Part 87 continues to read:

AUTHORITY: 48 Stat. 1066.1082, as amended; 47 U.S.C. 154, 303, unless otherwise noted. Interpret or apply 48 Stat. 1064-1068, 1081-1105, as amended; 47 U.S.C. 151-156, 301-609.

2. Paragraph (d)(1) of Section 87.303 is revised to read as follows:

§ 87.303 Frequencies.

(d)(1) Frequencies in the bands 1435-1525 MHz and 2360-2390 MHz are assigned primarily for telemetry and telecommand operations associated with the flight testing of manned or unmanned aircraft and missiles, or their major components. The bands 1523-1535 MHz and 2310-2360 MHz are also available for these purposes on a secondary basis. Permissible uses of these bands include telemetry and telecommand transmissions associated with the launching and reentry into the earth's atmosphere as well as any incidental orbiting prior to reentry of manned or unmanned objects undergoing flight tests. In the 1435-1530 MHz band, the following frequencies are shared with flight telemetry mobile stations: 1444.5, 1453.5, 1501.5, 1515.5, 1524.5 and 1525.5 MHz. In the 2360-2390 MHz band, the following frequencies may be assigned on a co-equal basis for telemetry and associated telecommand operations in fully operational or expendable and re-usable launch vehicles whether or not such operations involve flight testing: 2364.5, 2370.5 and 2382.5 MHz. In 2310-2390 MHz band, all other telemetry and telecommand uses are secondary.

APPENDIX F

Coordination Study for Feeder Link Earth Station

MICROWAVE PLANNING INC.

April 6, 1993

****
** CLIENT **
** COPY **
****

RE: CD RADIO INC
WASHINGTON, DC 6.7 GHZ TRANSMIT EARTH STATION

Enclosed is coordination data for an Earth Station to be located in Washington, DC. This earth station will transmit on 6715 MHz and 6725 MHz to satellites at 80 & 110 degrees longitude.

We request that you examine this data and if you find any potential interference conflicts, please notify us at your earliest convenience. If a response is not received by May 6, 1993, we will assume that no interference cases exist.

Thank you for your cooperation in this matter.

Sincerely,

MICROWAVE PLANNING, INC.

Kenneth W. Tanck

Kenneth W. Tanck
Director of Operations

Enclosures

P.O. BOX 741115 • DALLAS, TX 75374-1115 • (214) 437-4667 • FAX (214) 644-8787

MICROWAVE PLANNING, INC.
P.O. BOX 741115
DALLAS, TX 75374-1115
(214) 437-4667

EARTH STATION COORDINATION DATA

COMPANY: CD RADIO INC
DATE: APRIL 6, 1993

SITE NAME, STATE	WASHINGTON, DC
CALL SIGN	
LATITUDE	38-54-10.0 N.
LONGITUDE	77-02-55.0 W.
ELEVATION	65 FEET / 20 METERS
OPERATING FREQUENCIES	
TRANSMIT	6715 & 6725 MHZ
EMISSION DESIGNATOR	6M67 G7E
RADIO CLIMATE	A
RAIN ZONE	2
SATELLITE ORBIT RANGE	80 W. / 110 W.
AZIMUTH RANGE	184.7 / 225.9
ELEVATION ANGLES	44.8 / 33.5
ANTENNA DATA	
MODEL	REFERENCE PATTERN 32-25LOG(THETA)
SIZE (METERS)	5.6
GAIN	50.0 @ 6.7 GHZ
3 DB BEAMWIDTH	0.5
15 DB BEAMWIDTH	1.0
CENTERLINE HEIGHT	85 FEET / 26 METERS
MAXIMUM TRANSMIT POWER	2.6 DBW/4 KHZ
MAXIMUM EIRP	52.6 DBW/4 KHZ
COORDINATION DISTANCE (KM)	
GREAT CIRCLE	197.9
RAIN SCATTER	100.0
INTERFERENCE OBJECTIVES (DBW)	
LONG TERM	-154.0
SHORT TERM	-131.0

MICROWAVE PLANNING, INC

COMPANY: CD RADIO INC
SITE: WASHINGTON, DC 38-54-10.0 N. 77-02-55.0 W.
DATE: APRIL 6, 1993

TABLE OF EARTH STATION COORDINATION VALUES

AZIMUTH (DEG)	ANTENNA DISC. ANGLE (DEG)	6.7 GHZ ANTENNA GAIN (DBI)	6.7 GHZ COORDINATION DISTANCE (KM)
0.	125.5	-10.0	182.7
5.	129.1	-10.0	182.7
10.	132.5	-10.0	182.7
15.	134.2	-10.0	182.7
20.	133.2	-10.0	182.7
25.	131.7	-10.0	182.7
30.	129.9	-10.0	182.7
35.	127.7	-10.0	182.7
40.	125.4	-10.0	182.7
45.	122.7	-10.0	182.7
50.	119.9	-10.0	182.7
55.	116.9	-10.0	182.7
60.	113.8	-10.0	182.7
65.	110.6	-10.0	182.7
70.	107.2	-10.0	182.7
75.	103.8	-10.0	182.7
80.	100.4	-10.0	182.7
85.	96.9	-10.0	182.7
90.	93.3	-10.0	182.7
95.	89.8	-10.0	182.7
100.	86.2	-10.0	182.7
105.	82.7	-10.0	182.7
110.	79.2	-10.0	182.7
115.	75.8	-10.0	182.7
120.	72.4	-10.0	182.7
125.	69.0	-10.0	182.7
130.	65.8	-10.0	182.7
135.	62.7	-10.0	182.7
140.	59.7	-10.0	182.7
145.	56.9	-10.0	182.7
150.	54.3	-10.0	182.7
155.	52.0	-10.0	182.7
160.	49.9	-10.0	182.7
165.	48.1	-10.0	182.7
170.	46.7	-9.7	183.7
175.	45.7	-9.5	184.7

NOTE - HORIZON IS LESS THAN 0.2 DEGREES AT ALL AZIMUTHS

MICROWAVE PLANNING, INC

COMPANY: CD RADIO INC
SITE: WASHINGTON, DC 38-54-10.0 N. 77-02-55.0 W.
DATE: APRIL 6, 1993

TABLE OF EARTH STATION COORDINATION VALUES

AZIMUTH (DEG)	ANTENNA DISC. ANGLE (DEG)	6.7 GHZ ANTENNA GAIN (DBI)	6.7 GHZ COORDINATION DISTANCE (KM)
180.	45.0	-9.3	185.2
185.	44.7	-9.3	185.6
190.	43.9	-9.1	186.3
195.	42.7	-8.7	187.5
200.	40.9	-8.3	189.2
205.	38.8	-7.7	191.5
210.	36.7	-7.1	193.9
215.	35.1	-6.6	195.9
220.	34.0	-6.3	197.3
225.	33.5	-6.1	197.9
230.	33.7	-6.2	197.6
235.	34.6	-6.5	196.5
240.	36.0	-6.9	194.7
245.	38.0	-7.5	192.4
250.	40.4	-8.2	189.7
255.	43.2	-8.9	186.9
260.	46.3	-9.6	184.1
265.	49.7	-10.0	182.7
270.	53.2	-10.0	182.7
275.	56.9	-10.0	182.7
280.	60.7	-10.0	182.7
285.	64.6	-10.0	182.7
290.	68.6	-10.0	182.7
295.	72.7	-10.0	182.7
300.	76.8	-10.0	182.7
305.	80.9	-10.0	182.7
310.	85.1	-10.0	182.7
315.	89.2	-10.0	182.7
320.	93.4	-10.0	182.7
325.	97.6	-10.0	182.7
330.	101.7	-10.0	182.7
335.	105.8	-10.0	182.7
340.	109.9	-10.0	182.7
345.	113.9	-10.0	182.7
350.	117.9	-10.0	182.7
355.	121.7	-10.0	182.7

NOTE - HORIZON IS LESS THAN 0.2 DEGREES AT ALL AZIMUTHS

RADIATION HAZARD CALCULATIONS

STATION LOCATION: WASHINGTON, DC

LATITUDE: 38-54-10.0 N.

LONGITUDE: 77-02-55.0 W.

ANTENNA SIZE = 5.6 Meters

FREQUENCY = 6.7 GHz

TRANSMITTER OUTPUT POWER = 2500 Watts

NUMBER OF TRANSMITTERS = 1

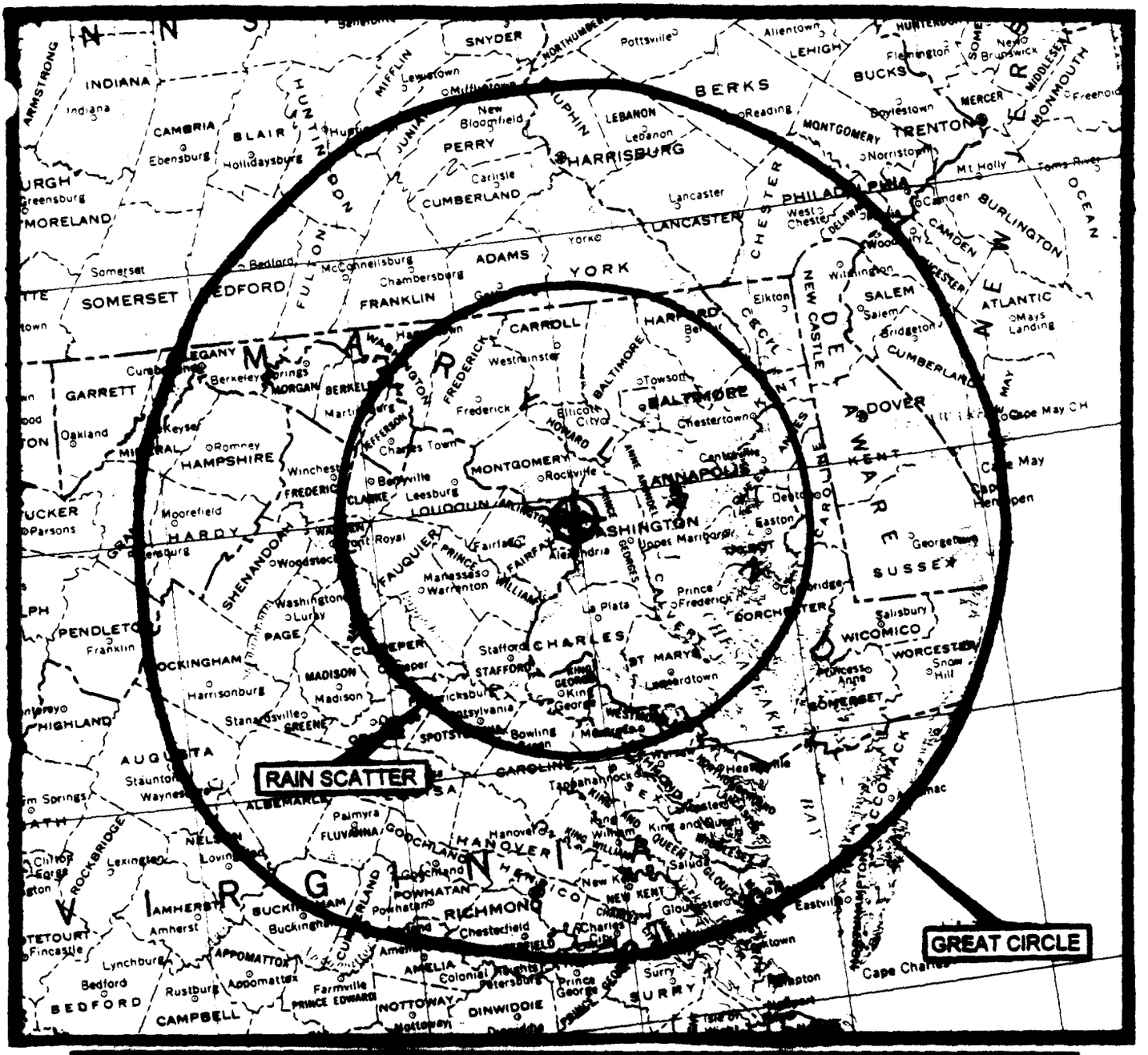
NEAR FIELD RADIUS = 175.1 Meters

BEGINNING OF FAR-FIELD REGION = 420.2 Meters

MAXIMUM MAIN BEAM NEAR FIELD POWER DENSITY = 26.39 mW/cm^2

RADIO FREQUENCY PROTECTION GUIDE = 5.0 mW/cm^2

Although the main-beam near field power density exceeds that specified in the ANSI Radio Frequency Protection Guide, access to the roof-top antenna location will be restricted so that workers and the general public will not be exposed to excessive radiation.



CD RADIO INC WASHINGTON, D.C.

6.7 GHz COORDINATION CONTOURS

APRIL 1993 MOFFET, LARSON & JOHNSON, INC.

SCALE 1:2,500,000

1 inch equals approximately 40 miles

25 0 25 50 75 100 125 150 175 200 MILES

25 0 25 50 75 100 125 150 175 200 KILOMETERS