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NON-IONIZING RADIATION HAZARD ASSESSMENT BY MEASUREMENT, CALCULATION AND ANALYSIS

FOR THE
ALL MOBILE VIDEO INC. (AMV) FACILITY
Carteret, New Jersey

Prepared For

All Mobile Video Inc.

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SECTION 1
INTRODUCTION AND BACKGROUND

1.1 Introduction

The purpose of this report is to update the work previously performed by Comsearch in February 2002. At that time a comprehensive RADHAZ evaluation was performed for Williams Vyxx Communications. Since that time ownership of the facility has been obtained by the All Mobile Video Company. Comsearch confirmed that there has been no change in the facility, its equipment or operation since February 2002. Therefore, the RADHAZ evaluation for Williams Vyvxx that is covered in the following pages applies now to the site owned by All Mobile Video Inc..

The purpose of this report is to document the results of the power density calculations and analysis performed on behalf of Williams Vyvx Communications by Comsearch. These calculations were performed using parametric data and site drawings provided by the Williams Vyvx Communications Personnel. The radiation measurements performed in February 2000 at the teleport showed that the site was in compliance with the Federal Communication Commission (FCC) safety requirements. After the measurements were performed four earth station systems were added to the teleport. Williams Vyvx also plans to add five additional earth station systems to the teleport in the future. This Radiation safety Study takes into account the original measured levels and the impact on the electromagnetic environment of both the addition of the four earth station systems which are now in operation and the planned additional five earth station systems that will be put in operation in the future. The purpose of this study was to evaluate whether the Williams Vyvx Teleport in Carteret, New Jersey will be in compliance with the most recent human exposure guidelines for radio frequency radiation as adopted by the FCC taking into account the four new operational systems and the five earth stations to be added in the future. The expansion in operational and planned systems since the site measurements were made increases the number of transmitting satellite earth stations from fourteen to twenty-three.

The purpose of these calculations is to evaluate the radiation safety level of the site after the expansion is complete. The new operational transmitting systems are designated with double asterisks and the planned systems with triple asterisks in Table 1.

The guidelines referenced by the FCC are intended to apply to both occupational (workers at the earth station facility) exposure as well as general public exposures to radio frequency radiation. Therefore, the data presented in this report can be used to determine potential radiation hazards, which may affect persons working at or living within the vicinity of the facility after the expansion of the site has taken place.

1.2 Background

The Federal Communications Commission (FCC) regulates operators in various communication services around the country as to the total RF power that can be transmitted from each transmitting station and the power of each transmitter. Following several public notices and inquiries to other government agencies, the Commission

determined that an FCC regulated facility should be required to comply with established guidelines concerning the potential effects and hazards of RF radiation. Therefore, the FCC issued a report in March of 1985 that in effect amended their rules and provided for an environmental analysis in regard to human exposure to RF radiation. The exposure guidelines for the FCC radiation policy were placed in effect on January 1, 1986.
On August 1, 1996, the Federal Communications Commission issued a Report and Order (FCC 96-326) amending the Commission's rules to adopt new guidelines for evaluating the environmental effects of radio frequency (RF) radiation from FCC-regulated transmitters. In R&O (FCC 96-326), the FCC identified two reports developed by different agencies. The first from the American National Standards Institute (ANSI) which adopted guidelines from the Institute of Electrical and Electronic Engineers, Inc. (IEEE) to formulate ANSI/IEEE (C95.1-1992), and the second from the National Council on Radiation Protection and Measurements (NCRP) which formulated NCRP Report No.86 (1986).

The FCC has adopted limits for maximum permissible exposure (MPE) generally based on the exposure guidelines set forth in NCRP Report No. 86 (1986). In the frequency range from 100 MHz to 1500 MHz, exposure limits for field strength and power density are also generally based on those contained in the ANSI/IEEE report (C95.1-1992).

These guidelines were chosen because they are scientifically based, widely accepted, and applicable to the general population as well as to workers. The currently adopted FCC standard establishes exposure limits for controlled as well as uncontrolled environments. Controlled environments are locations where there is exposure that may be incurred by persons who are aware of the potential for exposure as a circumstance of employment or by other cognizant persons. Uncontrolled environments are locations where there is the exposure of individuals who have no knowledge or control over their exposure. Compliance to the FCC's RF radiation policy is generally through a process of self-certification. This study deals with the levels of exposure at the perimeter (the fence), which is the boundary of the uncontrolled area, and inside of the Williams Vyvx Communications, Carteret, New Jersey Earth Station facility or controlled area as defined by the FCC. The FCC MPE limit for the uncontrolled areas for the frequency range of the earth station Transmitters is $1 mW/cm^2$ and for the uncontrolled areas $5 mW/cm^2$. These limits are outlined in Table 5 and graphically represented in Figure 2.

SECTION

TWO

SECTION 2
METHODOLOGY

This Radiation Safety Study was performed by Comsearch for earth station systems used at the teleport operated by Williams Vyvx Communications, at Carteret, New Jersey. The Study was performed using calculation and analytical techniques presented in the Federal Communication Commission (FCC) OET Bulletin 65 entitled, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields," dated August 1997. The study utilized the diameter, frequency and power information provided by Williams Vyvx Communications to calculate the power density levels at different points of interest at the facility with respect to the far-field region, transition zone and near-field region. The calculated power density levels are then added to the previously measured levels at the teleport to realize the new levels (W_{new}) when both the four new operational transmitting systems and the five planned earth station systems are installed. The new power density levels (W_{new}), were then compared to the established FCC maximum permissible exposure (MPE) limits to identify and quantify whether any hazardous areas exist inside or at the fence that surrounds the earth station facility.

The earth station characteristics are listed in Table 1.

Table 1. Earth Station Characteristics

Earth Station	Antenna Size (Meter)	Gain (dB)	P_t (Watt)
COM1	10.00	54.7	100.00
COM2	10.00	54.7	100.00
COM3	9.20	54.0	100.00
COM4	7.00	51.6	100.00
COM5	9.20	54.0	100.00
*COM6			
COM7	9.00	53.8	100.00
COM8	7.00	51.6	100.00
COM9	12.00	54.0	100.00
*COM10			
COM11	8.10	52.9	694.2
COM12	8.10	52.9	694.2
COM13	9.20	54.0	100.00
COM14	9.20	54.0	100.00
COM15	9.00	53.8	100.00
*COM16			
COM17	9.00	53.8	100.00

* These are the receive only systems

Table 1. (Cont)

Earth Station	Antenna Size (Meter)	Gain (dB)	P_t (Watt)
**COM18	9.00	53.8	700
**COM19	4.60	48.0	141
**COM20	9.10	53.9	550
**COM21	5.60	49.7	350
***COM22	9.00	51.9	700
***COM23	9.00	51.9	700
***COM24	4.60	53.1	125
***COM25	4.60	53.1	125
***COM26	4.60	46.1	300

** These are systems that were added since the RADHAZ measurements, February 2000

*** These are the proposed systems for the future expansion of the site

Figure1 is a sketch of the site showing the relative locations of the earth station antennas, the perimeter chain link fence and the perimeter locations where the power density calculations were made. The calculation points and antenna locations are all referenced to the origin point marked with an ”A” on the sketch. The facility chain link fence is designated in the sketch with a dashed line.

2.1 Power Density Calculation Along and Inside Fence

Calculations were performed to determine the power density at a series of points along the perimeter fence and other areas of the Williams Vyvx Communications facility. The calculations were made using the formulas in the FCC Office of Science and Technology (OST) Bulletin No. 65, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields, Revision 97-01,” August 1997. The power density at each of the calculation points is the result of the summation of the power density created by each of the transmitting earth station systems. There are currently twenty-one systems (18 transmit and 3 receive) operating at this site, of which four of the eighteen transmit systems were added since the RADHAZ measurement in February, 2000. Only the parameters of the five proposed systems and the four that were added since the site measurements were performed were used in the calculations, since the previous power density measurements (W_{before}) were made before they were installed.

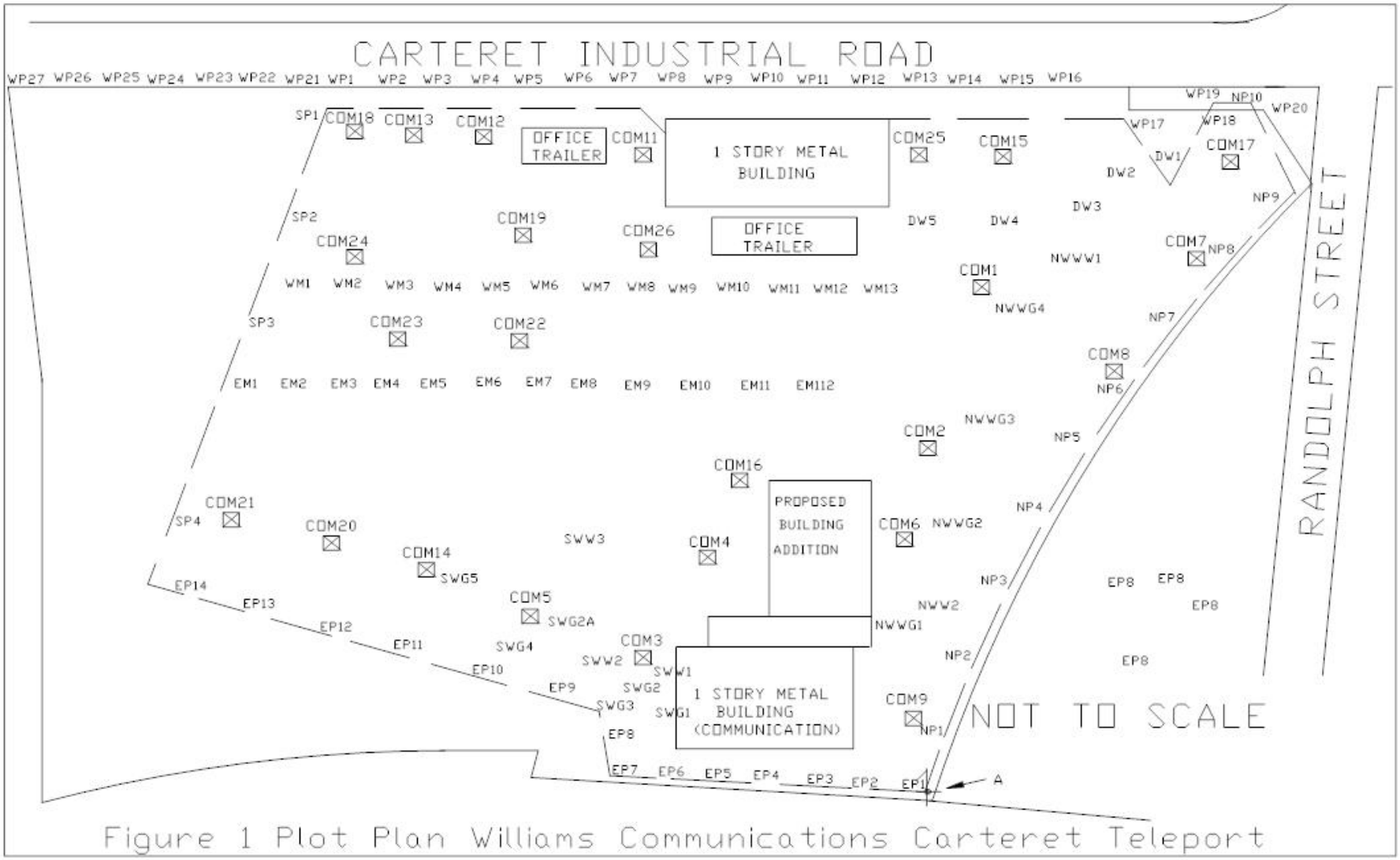

Figure 1 Plot Plan Williams Communications Carteret Teleport

The following formula was used for the calculation of the power density levels:

$$W_{d(n)} = 0.1 * P_t * G_n/(4\Pi) * R_n^2$$

And,

$$W_{new} = \Sigma(W_{measured} + W_{4operational} + W_{5planned})$$

Where,

$W_{d(n)}$ = Calculation of power density level at each point of interest, mWatt/cm^2

W_{before} = Measured power density levels without the nine antennas, mWatt/cm^2

$W_{4operational}$ = Calculated power density levels at each point of interest with Transmitting systems added since measurements were performed, mWatt/cm^2

$W_{5planned}$ = Calculated power density levels at each point of interest with the planned transmit systems, mWatt/cm^2

W_{new} = Total power density level due to all transmitting systems when site expansion is complete, mWatt/cm^2

P_t = Transmit power of each earth station system, Watts

G_n = Gain of the earth station antenna in the direction of the calculation point
$= 10^{32-25*\log\theta} \geq .1$

R_n = Distance from point of interest to the nine antennas, meters

For additional information on the equations used, refer to the FCC's Office of Engineering and Technology (OET) Bulletin #65 (Edition 97-01) at: http:// www: fcc.gov/oet/rfsafety", which provides full details regarding FCC guidelines for human exposure to radio frequency electromagnetic fields.

2.2 Power Density Calculation At Each Antenna

The following formula was used for the calculation of the power density at each earth station antenna.

$$W_g = .1 * P_{t/} S_a$$

$$W_{ms} = .1 * 4 * P_{t/} A_s$$

$$W_{x,\,y} = 0.1 * P_t * G_n/(4\Pi) * R_n^{\,2}$$

And,

$$W_C = \Sigma(W_g + W_{x,\,y})$$

Where,

W_g = Power density at each antenna between main reflector and ground, mWatts/cm^2

W_{ms} = Power density between main reflector and feed or sub reflector, mWatts/cm^2

$W_{x,\,y}$ = Power density at antenna x due to the presence of antenna y, mWatts/cm^2

W_C = Total calculated power density at each earth station antenna, mWatts/cm^2

P_t = Transmit power of each earth station system, Watts

R_n = Distance to the calculation point from each earth station antenna, meters

S_a = Antenna surface area, meter^2

A_s = Area of feed or sub reflector, meter^2

For additional information on the equations used, refer to the FCC's Office of Engineering and Technology (OET) Bulletin #65 (Edition 97-01) at: http:// www: fcc.gov/oet/rfsafety", which provides full details regarding FCC guidelines for human exposure to radio frequency electromagnetic fields.

SECTION

THREE

SECTION 3
DATA PRESENTATION

The calculations in this study were made using the parameters of the systems at the facility plus those added since the last measurement and those proposed for future expansion. The previously measured points of interest along, inside the fence and around the facility were added to the newly calculated levels. The results of these calculations are shown in Tables 3 and 4. Table 2, shows the power density levels calculated within and near the antenna assemblies that is between the feeds or sub reflector and the main reflector of the antenna (W_{ms}). The maximum power density at the site where personnel will have normal access will be found between the main reflector and ground at each antenna. The power density level caused by a single system between the main reflector and ground is W_g. The total power density at these points must also take into account the radiation from the other systems located at the facility at these points. This power density is defined as W_C.

3.1 Calculation Results

Table 2. Power Density, Areas Around Antenna

Earth Station	W_{ms} (mW/cm^2)	W_g (mW/cm^2)	W_M (mW/cm^2)	W_C (mW/cm^2)	% Before FCC MPE	% New FCC MPE
COM1	28.78794	0.12731	0.00700	0.12968	0.14000	2.59356
COM2	28.78794	0.12731	0.00910	0.12940	0.18200	2.58804
COM3	42.86085	0.15041	0.00480	0.15287	0.09600	3.05741
COM4	64.28857	0.25981	0.00560	0.26188	0.11200	5.23763
COM5	42.86085	0.15041	0.00640	0.15417	0.12800	3.08335
*COM6			0	0.00309	0	0.06171
COM7	34.21324	0.15717	0.05100	0.15897	1.02000	3.17939
COM8	64.28857	0.25981	0.00980	0.26164	0.19600	5.23283
COM9	17.62041	0.08841	0.00600	0.08960	0.12000	1.79192
*COM10			0	0.00255	0	0.05094
COM11	353.40547	1.34700	0.00780	1.35076	0.15600	27.0152
COM12	353.40547	1.34700	0.00730	1.35213	0.14600	27.0425
COM13	42.86085	0.15041	0.01300	0.15897	0.26000	3.17943
COM14	42.86085	0.15041	0.00780	0.15683	0.15600	3.13656
COM15	34.21324	0.15717	0.00860	0.15947	0.17200	3.18933
*COM16			0	0.00211	0	0.04214
COM17	34.21324	0.15717	0.01000	0.15841	0.20000	3.16812
**COM18	239.49265	1.10019	0.00000	1.10442	0.00000	22.08834
**COM19	192.96265	0.84832	0.00000	0.86093	0.00000	17.21863
**COM20	188.17279	0.84554	0.00000	0.85176	0.00000	17.03514
**COM21	568.33682	1.42084	0.00000	1.42591	0.00000	28.51812
***COM22	239.49265	1.10019	0.00000	1.10494	0.00000	22.09881

W_M – Power Density levels Measured, February 2000

W_C – Total calculated power density at each earth station antenna, mWatts/cm^2

Table 2 (Cont)

Earth Station	W_{ms} (mW/cm^2)	W_g (mW/cm^2)	W_M (mW/cm^2)	W_C (mW/cm^2)	% Before FCC MPE	% New FCC MPE
***COM23	239.49265	1.10019	0.00000	1.10548	0	22.10951
***COM24	171.06618	0.75205	0.00000	0.75671	0	15.13424
***COM25	171.06618	0.75205	0.00000	0.75327	0	15.06544
***COM26	410.55882	1.80493	0.00000	1.80734	0	36.14681

The power density levels calculated along the fence and within the facility are the results of the radiation levels calculated from the new and planned systems added to the levels that were measured previously. The power density calculated at the fence represents the maximum level that will be radiated into the uncontrolled area outside of the facility.

Table 3. Power Density Along Fence

Points of Interest	W_{before} (mw/cm^2)	$W_{4operational}$ (mw/cm^2)	$W_{5planned}$ (mw/cm^2)	W_{new} (mw/cm^2)
NP1	0.00490	0.00007	0.00009	0.00506
NP2	0.01400	0.00007	0.00010	0.01416
NP3	0.01400	0.00006	0.00010	0.01416
NP4	0.01200	0.00006	0.00009	0.01215
NP5	0.00920	0.00005	0.00009	0.00934
NP6	0.00910	0.00005	0.00008	0.00922
NP7	0.06400	0.00004	0.00006	0.06410
NP8	0.00300	0.00004	0.00005	0.00309
NP9	0.00330	0.00002	0.00002	0.00334
NP10	0.00630	0.00003	0.00005	0.00638
WP1	0.01800	0.00264	0.00365	0.02430
WP2	0.01000	0.00627	0.00124	0.01751
WP3	0.01000	0.00273	0.00064	0.01336
WP4	0.00500	0.00124	0.00042	0.00666
WP5	0.00170	0.00080	0.00029	0.00280
WP6	0.00170	0.00065	0.00032	0.00267
WP7	0.00006	0.00055	0.00042	0.00103
WP8	0.00230	0.00039	0.00049	0.00319
WP9	0.00200	0.00027	0.00057	0.00284
WP10	0.00043	0.00019	0.00049	0.00111
WP11	0.00025	0.00015	0.00045	0.00085
WP12	0.00006	0.00011	0.00085	0.00103
WP13	0.00000	0.00009	0.00127	0.00136
WP14	0.00170	0.00008	0.00040	0.00217
WP15	0.00670	0.00006	0.00019	0.00695

Table 3 (Cont)

Points of Interest	W_{before} (mw/cm^2)	$W_{4operational}$ (mw/cm^2)	$W_{5planned}$ (mw/cm^2)	W_{new} (mw/cm^2)
WP16	0.00560	0.00005	0.00012	0.00577
WP17	0.00470	0.00005	0.00009	0.00484
WP18	0.01000	0.00004	0.00007	0.01011
WP19	0.01300	0.00003	0.00005	0.01309
WP20	0.01200	0.00002	0.00002	0.01204
EP1	0.01800	0.00007	0.00020	0.01827
EP2	0.02500	0.00009	0.00022	0.02531
EP3	0.01500	0.00010	0.00024	0.01534
EP4	0.00340	0.00012	0.00026	0.00378
EP5	0.00480	0.00014	0.00027	0.00521
EP6	0.00300	0.00018	0.00029	0.00347
EP7	0.00750	0.00023	0.00028	0.00801
EP8	0.00500	0.00030	0.00031	0.00561
EP9	0.00250	0.00061	0.00033	0.00344
EP10	0.00360	0.00138	0.00031	0.00529
EP11	0.00490	0.00655	0.00036	0.01181
EP12	0.00450	0.00357	0.00047	0.00854
EP13	0.00600	0.00401	0.00069	0.01070
EP14	0.00650	0.00129	0.00100	0.00878
SP1	0.01300	0.00431	0.00454	0.02185
SP2	0.00630	0.00274	0.00662	0.01566
SP3	0.00260	0.00185	0.00198	0.00643
SP4	0.00630	0.00138	0.00115	0.00883
WM1	0.00037	0.00198	0.00235	0.00469
EM1	0.00250	0.00157	0.00177	0.00584

Table 4 Power Density Inside Fence

Points of Interest	W_{before} (mw/cm^2)	$W_{4operational}$ (mw/cm^2)	$W_{5planned}$ (mw/cm^2)	W_{new} (mw/cm^2)
EM2	0.0015	0.00587	0.00103	0.00840
EM3	0.005	0.01137	0.00072	0.01709
EM4	0.0045	0.00648	0.00052	0.01150
EM5	0.0026	0.00566	0.00041	0.00867
EM6	0.0016	0.00174	0.00039	0.00373
EM7	0.0016	0.00116	0.00045	0.00321
EM8	0.0017	0.00100	0.00065	0.00335
EM9	0.0028	0.00054	0.00128	0.00462

EM10	0.0026	0.00031	0.00192	0.00484
EM11	0.0021	0.00021	0.00118	0.00349

Table 4 (Cont)

Points of Interest	W_{before} (mw/cm^2)	$W_{4operational}$ (mw/cm^2)	$W_{5planned}$ (mw/cm^2)	W_{new} (mw/cm^2)
EM12	0.00130	0.00015	0.00105	0.00251
NWWG1	0.00100	0.00009	0.00034	0.00143
NWWG2	0.00100	0.00009	0.00049	0.00157
NWWG3	0.00130	0.00008	0.00059	0.00197
NWWG4	0.00900	0.00007	0.00068	0.00975
SWG1	0.00500	0.00019	0.00036	0.00555
SWG2	0.00680	0.00026	0.00037	0.00744
SWG2A	0.00540	0.00036	0.00050	0.00626
SWG3	0.00670	0.00039	0.00037	0.00746
SWG4	0.00430	0.00059	0.00038	0.00526
SWG5	0.00400	0.00083	0.00038	0.00521
SWW1	0.00280	0.00019	0.00038	0.00337
SWW2	0.00390	0.00027	0.00045	0.00462
SWW3	0.00480	0.00036	0.00068	0.00584
NWW2	0.00580	0.00008	0.00032	0.00620
NWWW1	0.00680	0.00005	0.00043	0.00729
DW1	0.00750	0.00005	0.00034	0.00789
DW2	0.00900	0.00006	0.00054	0.00960
DW3	0.00880	0.00007	0.00108	0.00995
DW4	0.00530	0.00009	0.00423	0.00962
DW5	0.00630	0.00011	0.00612	0.01253
WM2	0.00150	0.00400	0.00145	0.00696
WM3	0.00300	0.00419	0.00077	0.00796
WM4	0.00260	0.00304	0.00050	0.00614
WM5	0.00230	0.00199	0.00038	0.00467
WM6	0.00000	0.00134	0.00043	0.00177
WM7	0.00300	0.00358	0.00053	0.00711
WM8	0.00000	0.00203	0.00098	0.00301
WM9	0.00000	0.00053	0.00507	0.00560
WM10	0.00000	0.00029	0.00521	0.00550
WM11	0.00150	0.00020	0.00149	0.00318
WM12	0.00000	0.00014	0.00177	0.00191
WM13	0.00000	0.00011	0.00278	0.00290

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TITLE 47--TELECOMMUNICATION
CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION

PART 1--PRACTICE AND PROCEDURE--Table of Contents
Subpart I--Procedures Implementing the National Environmental Policy Act of 1969

Sec. 1.1310 Radiofrequency radiation exposure limits.

The criteria listed in Table 6 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, ``Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation."

Note to Introductory Paragraph: These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP) in ``Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86, Sections 17.4.1, 17.4.1.1, 17.4.2 and 17.4.3. Copyright NCRP, 1986, Bethesda, Maryland 20814. In the frequency range from 100 MHz to 1500 MHz, exposure limits for field strength and power density are also generally based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ``IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1-1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. [[Page 289]]

Table 5 Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0.....	614	1.63	*(100)	6
3.0-30.....	1842/f	4.89/f	*($900/f^2$)	6
30-300.....	61.4	0.163	1.0	6
300-1500.....	.....	.....	f/300	6
1500-100,000.....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34.....	614	1.63	*(100)	30
1.34-30.....	824/f	2.19/f	*($180/f^2$)	30
30-300.....	27.5	0.073	0.2	30
300-1500.....	.....	.....	f/1500	30
1500-100,000.....	.....	.....	1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Note 1 to Table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situationswhen an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

[61 FR 41016, Aug. 7, 1996]

FCC Limits for Maximum Permissible Exposure (MPE)

Plane-Wave Equivalent Power Density

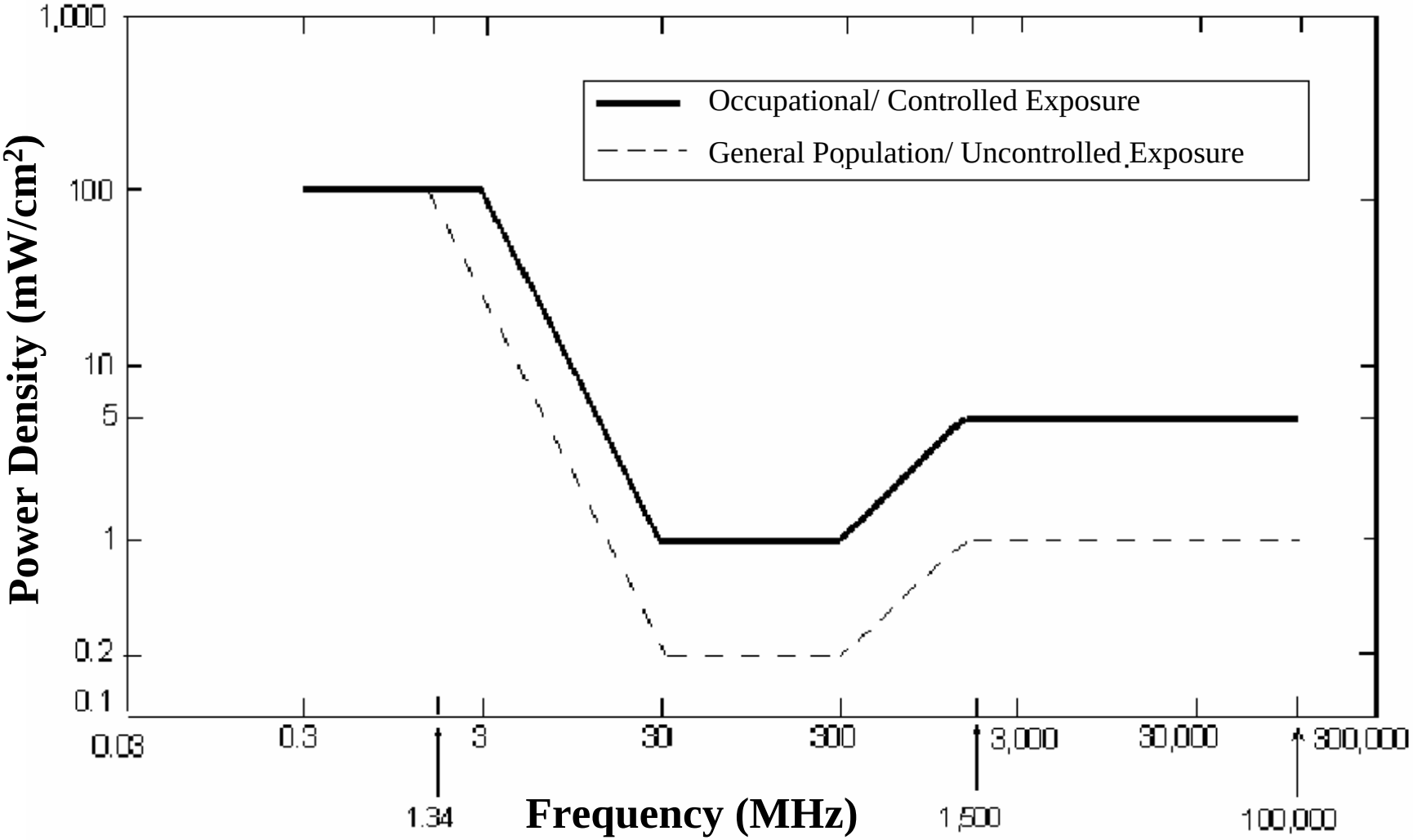


Figure 2

POWER DENSITY OF THE NORTHERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

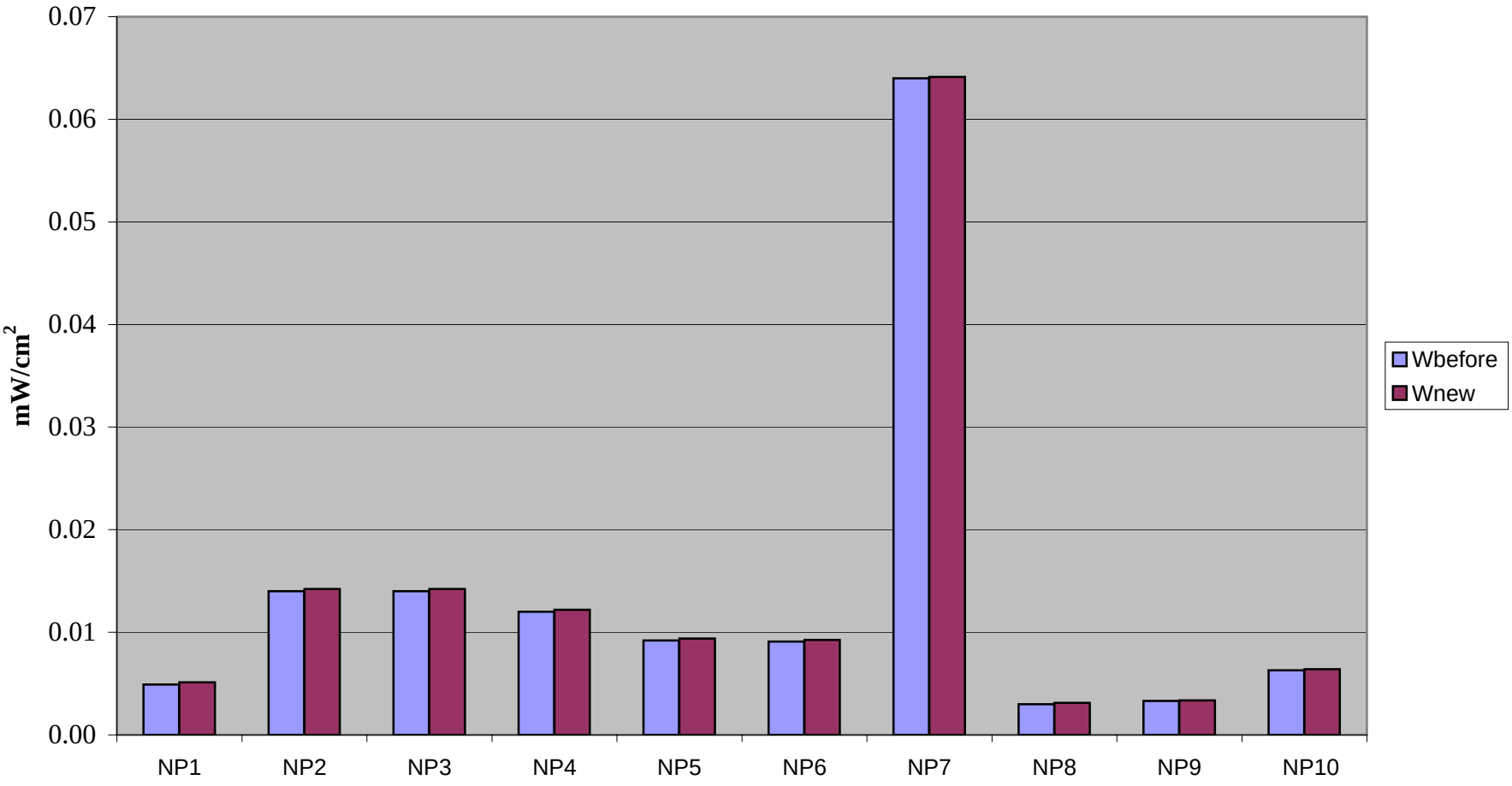


Figure 3

% OF FCC MPE FOR THE NORTHERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

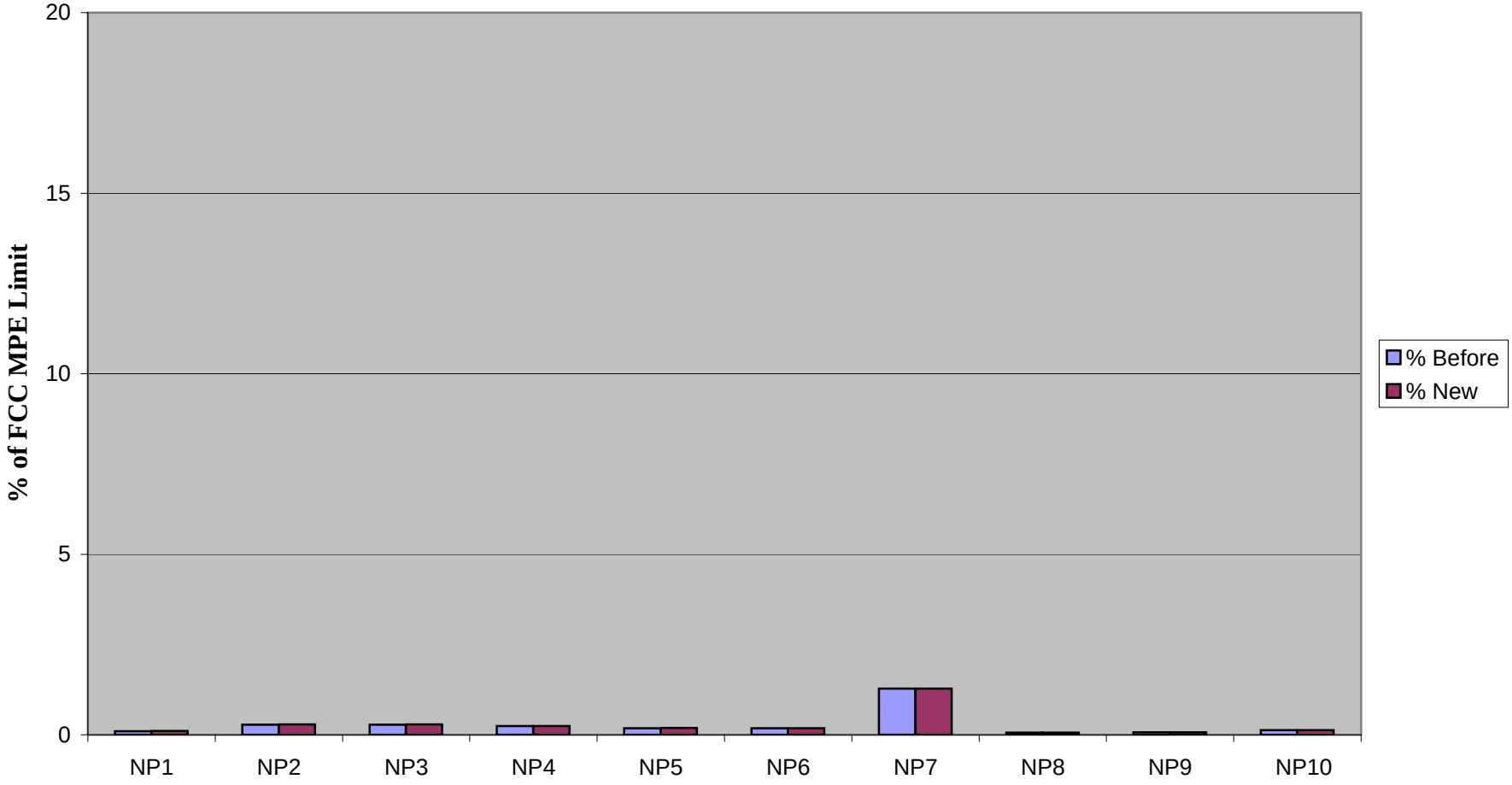


Figure 3 (Cont)

POWER DENSITY OF THE WESTERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

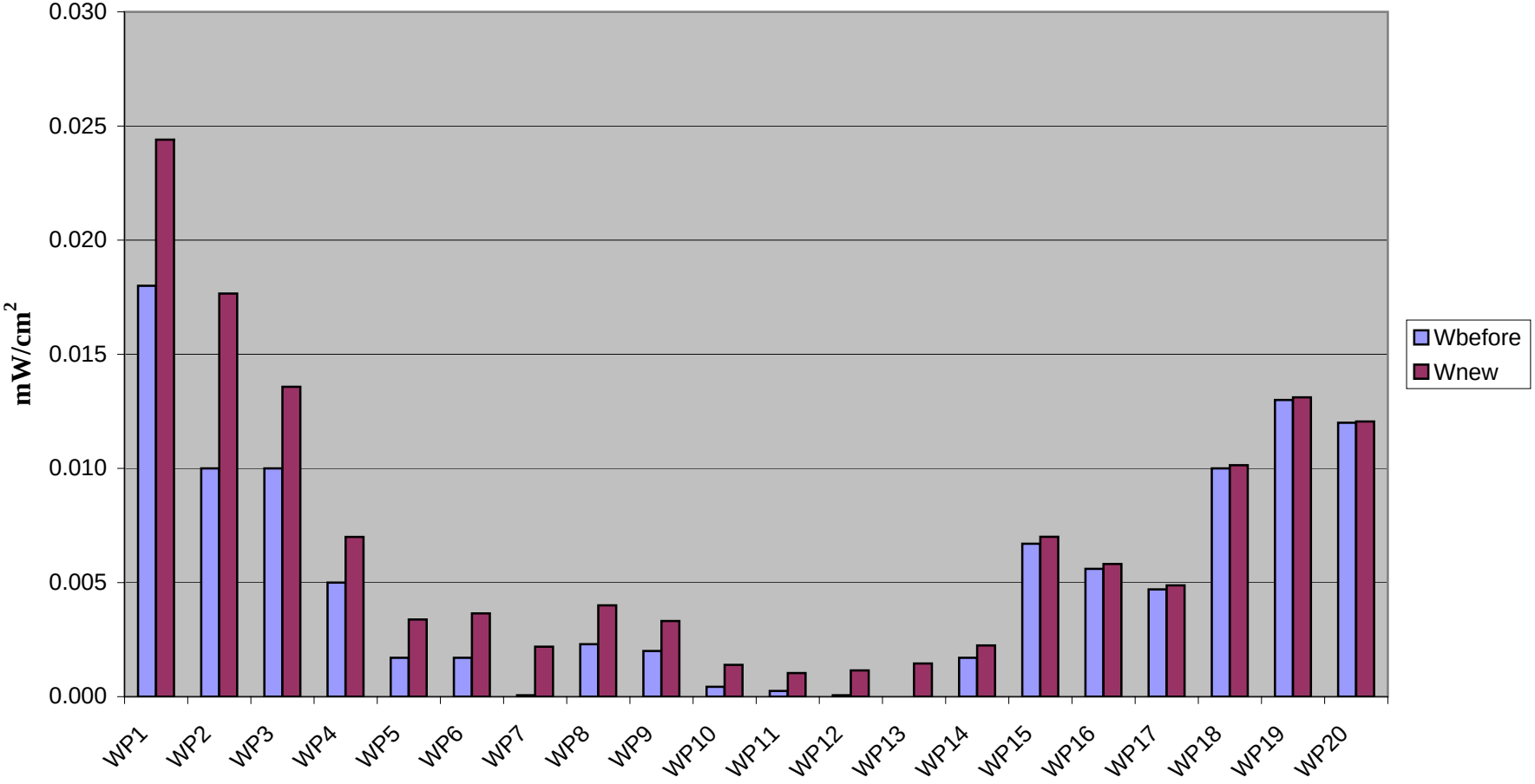


Figure 4

% OF FCC MPE OF THE WESTERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

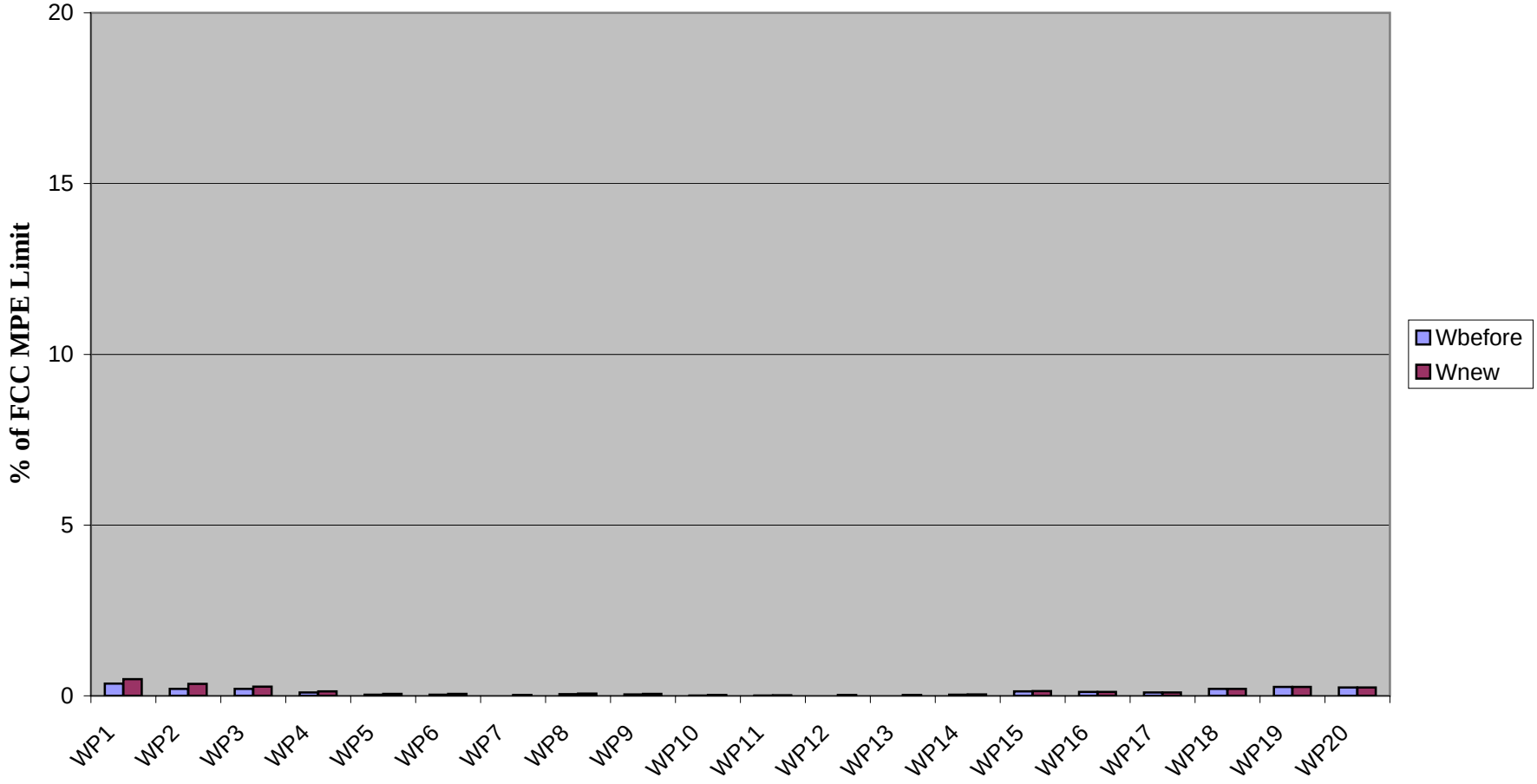


Figure 4 (Cont.)

POWER DENSITY OF THE EASTERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

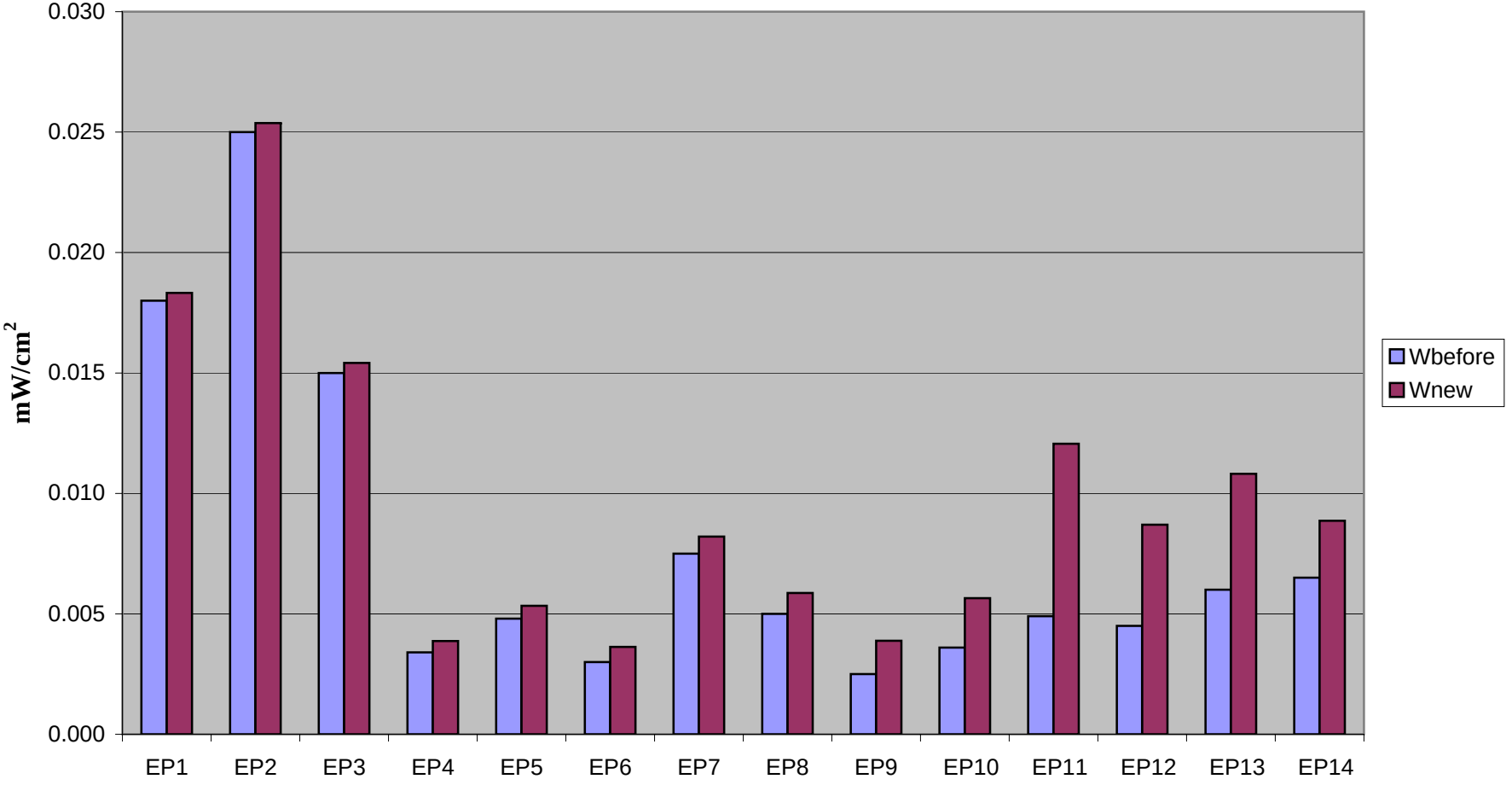


Figure 5

% OF FCC MPE OF THE EASTERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

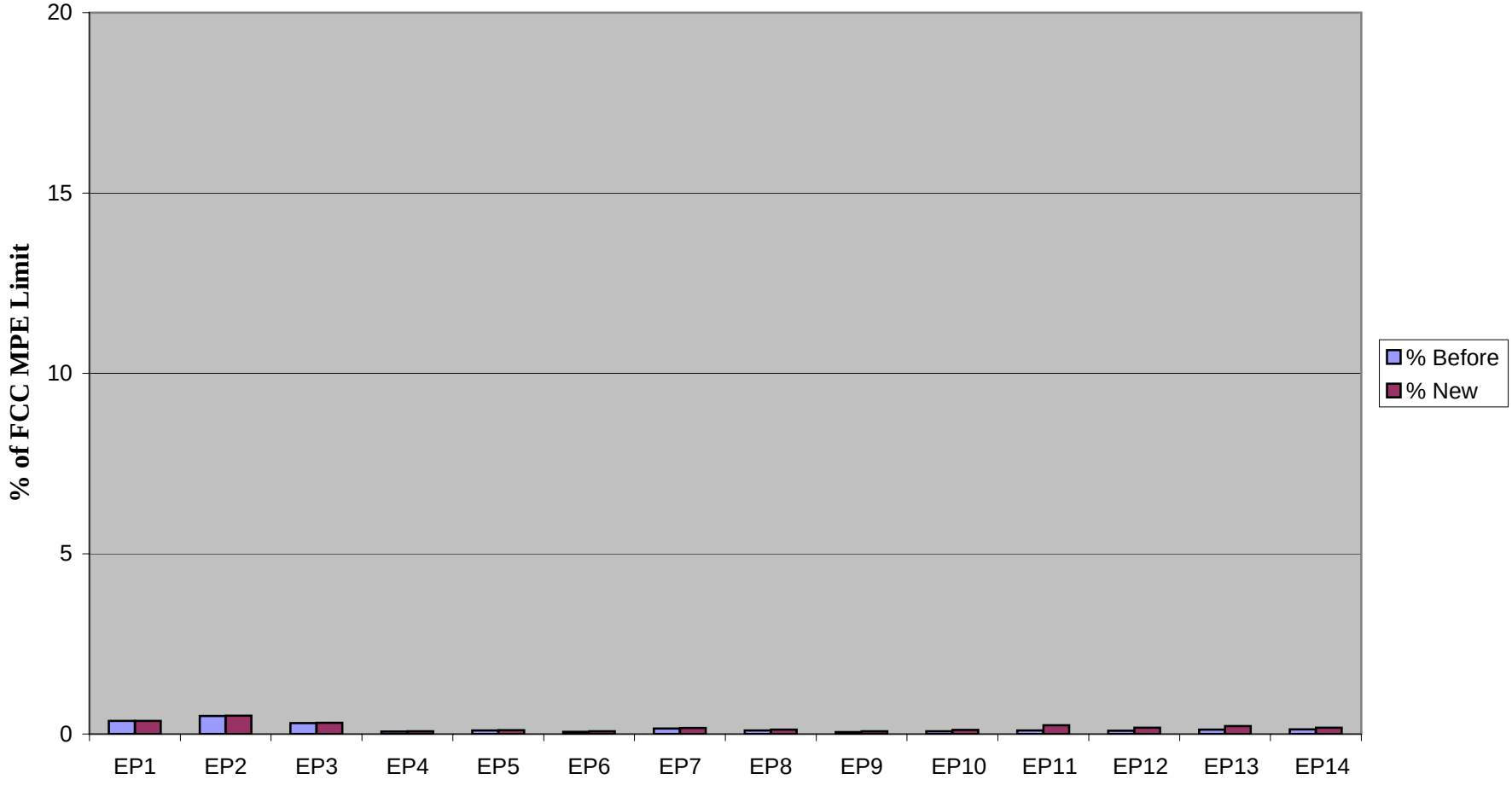


Figure 5 (Cont)

POWER DENSITY OF THE SOUTHERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

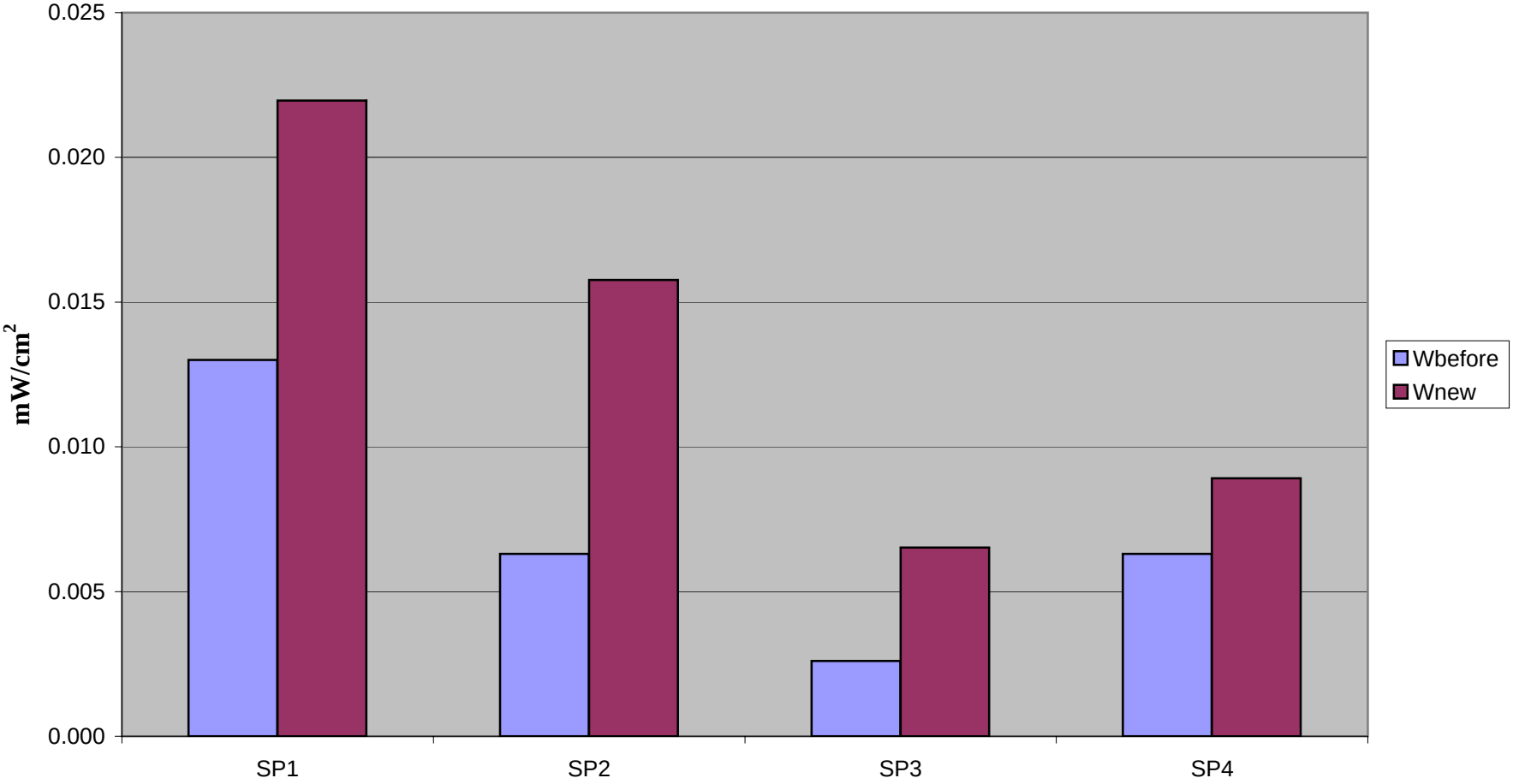


Figure 6

% OF FCC MPE FOR THE SOUTHERN PERIMETER POINTS (CONTROLLED ENVIRONMENT)

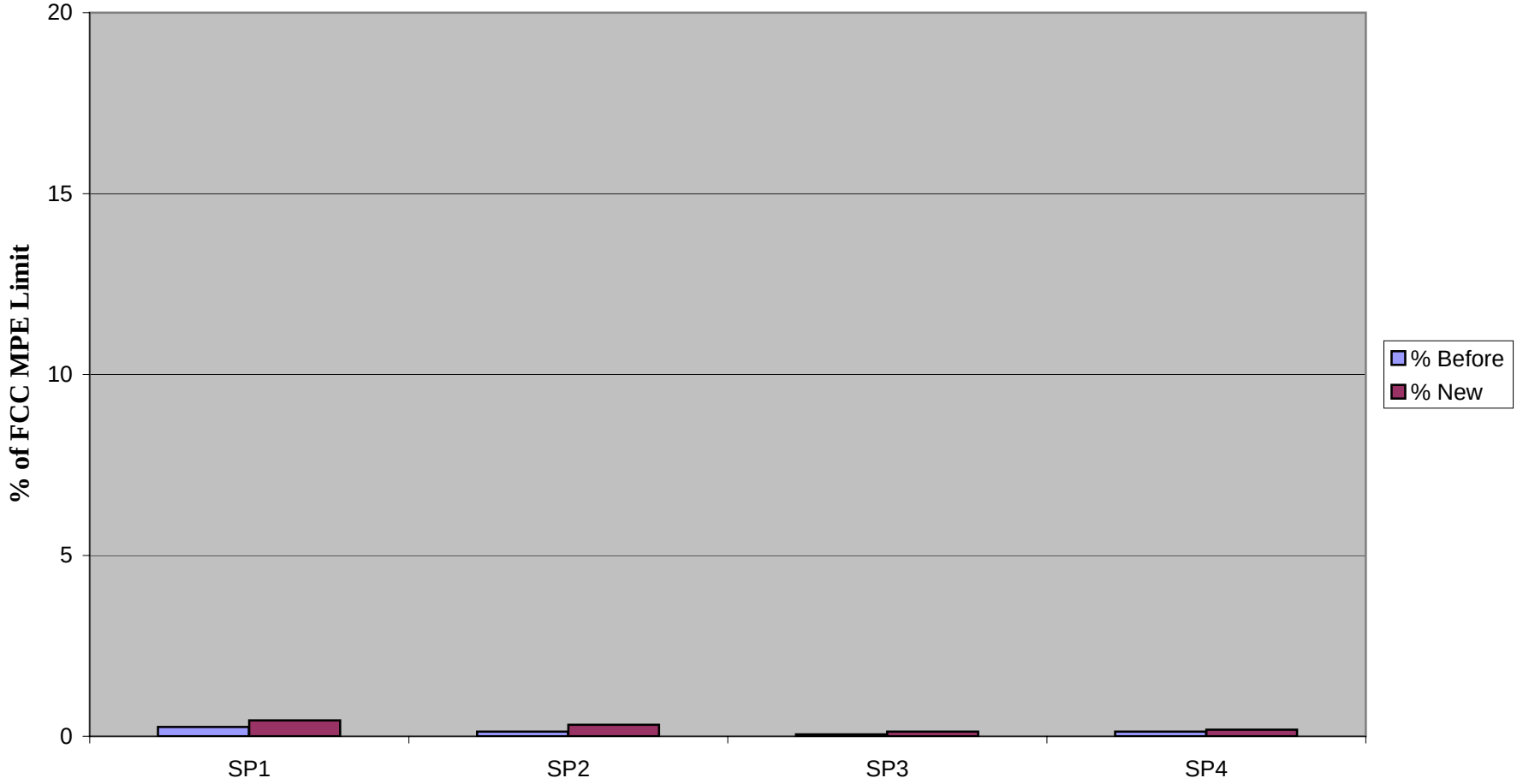


Figure 6 (Cont)

POWER DENSITY OF THE WEST MERIDIAN POINTS (CONTROLLED ENVIRONMENT)

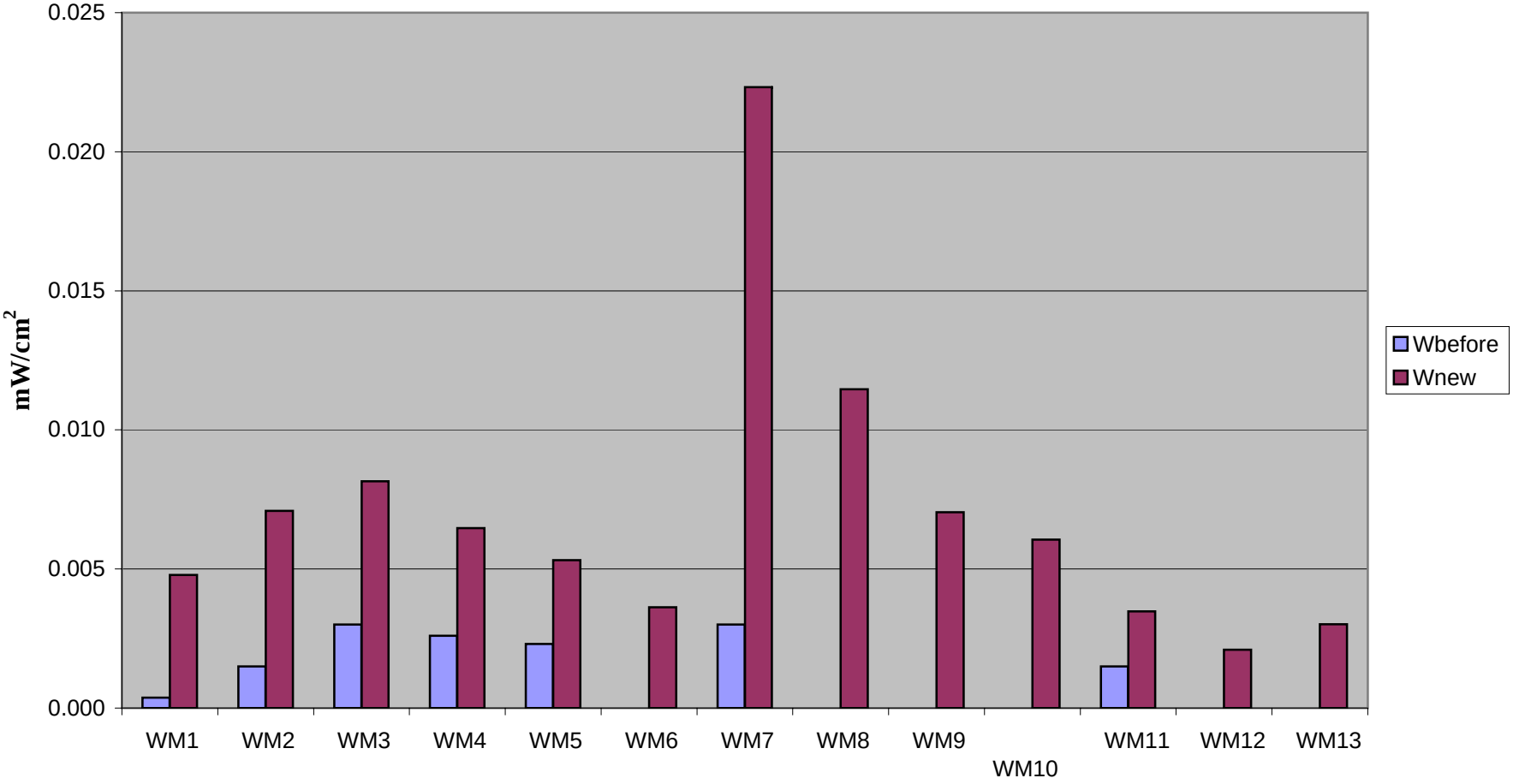


Figure 7

% OF FCC MPE FOR THE WESTERN MERIDIAN POINTS (CONTROLLED ENVIRONMENT)

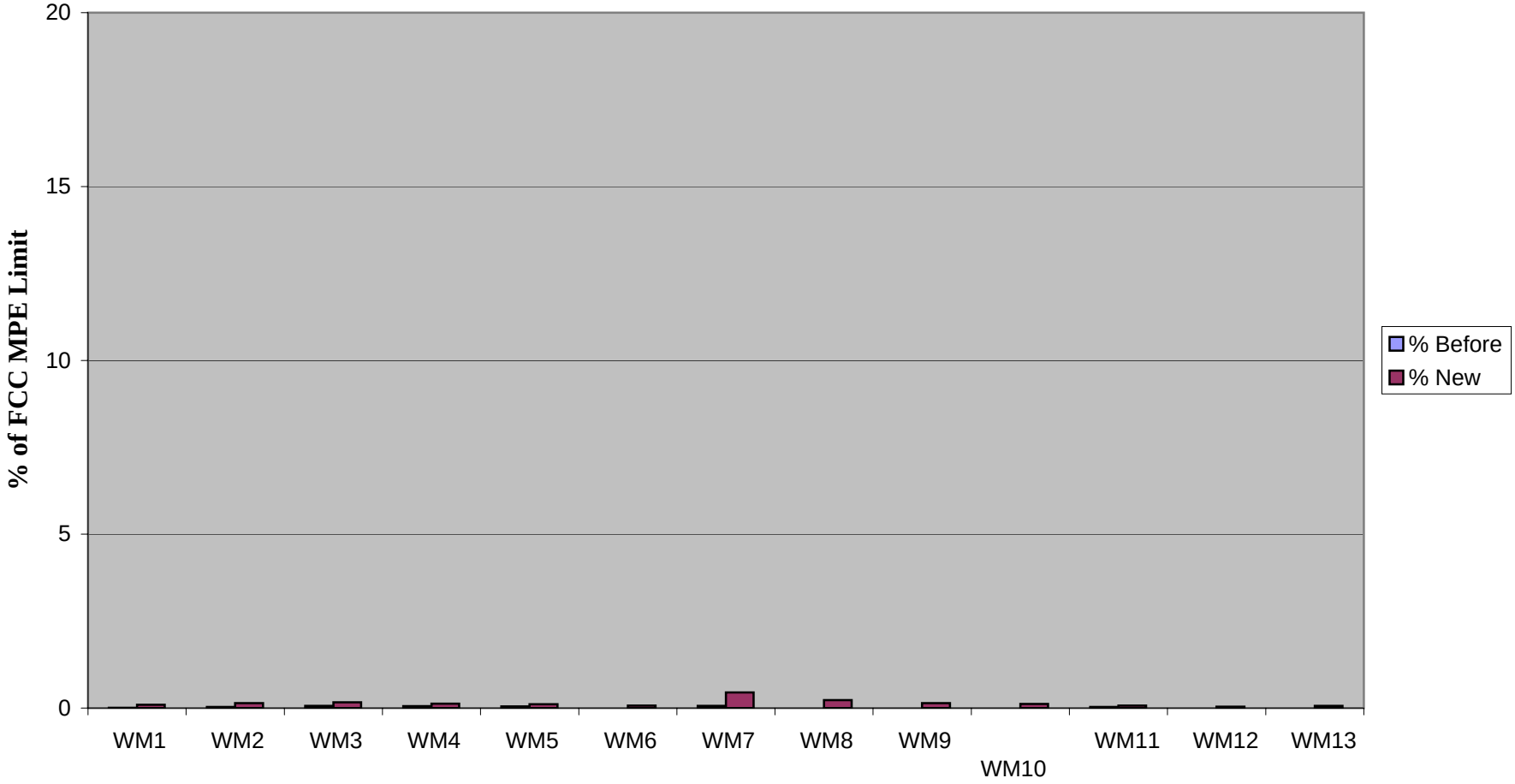


Figure 7 (Cont)

POWER DENSITY OF THE EASTERN MERIDIAN POINTS (CONTROLLED ENVIRONMENT)

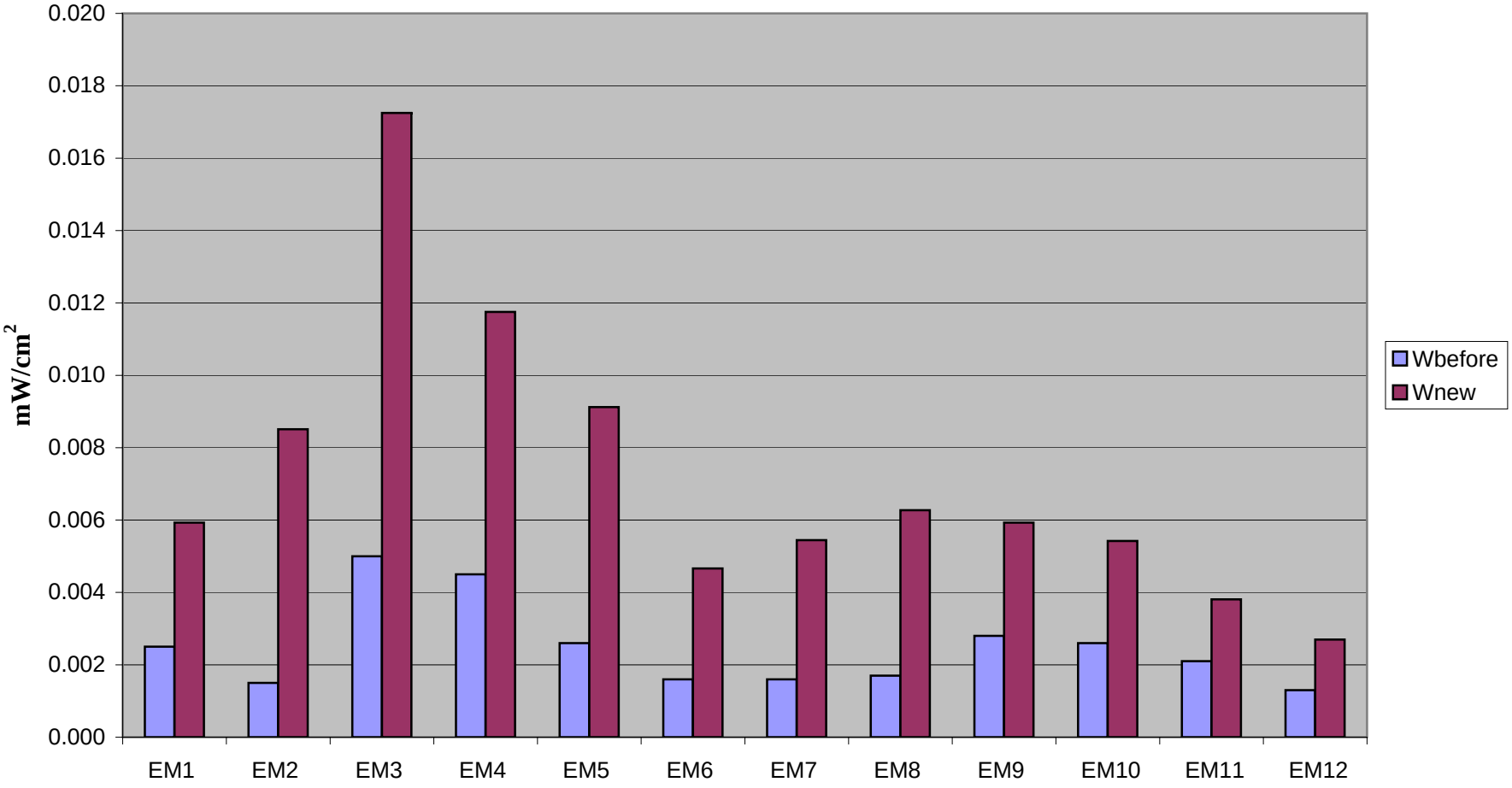


Figure 8

% OF FCC MPE FOR THE EASTERN MERIDIAN POINTS (CONTROLLED ENVIRONMENT)

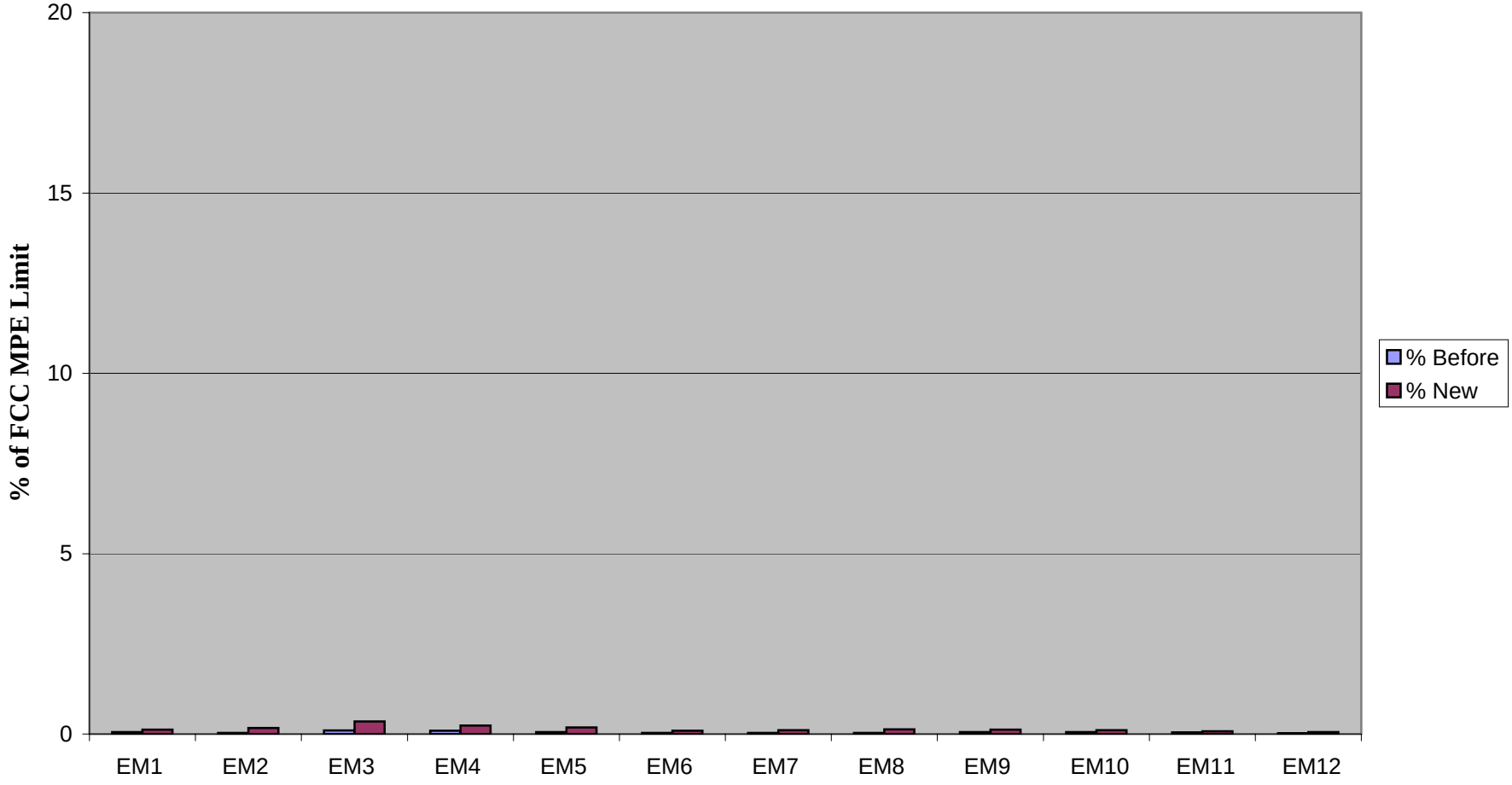


Figure 8 (Cont)

POWER DENSITY OF THE WAVEGUIDE RUNS (CONTROLLED ENVIRONMENT)

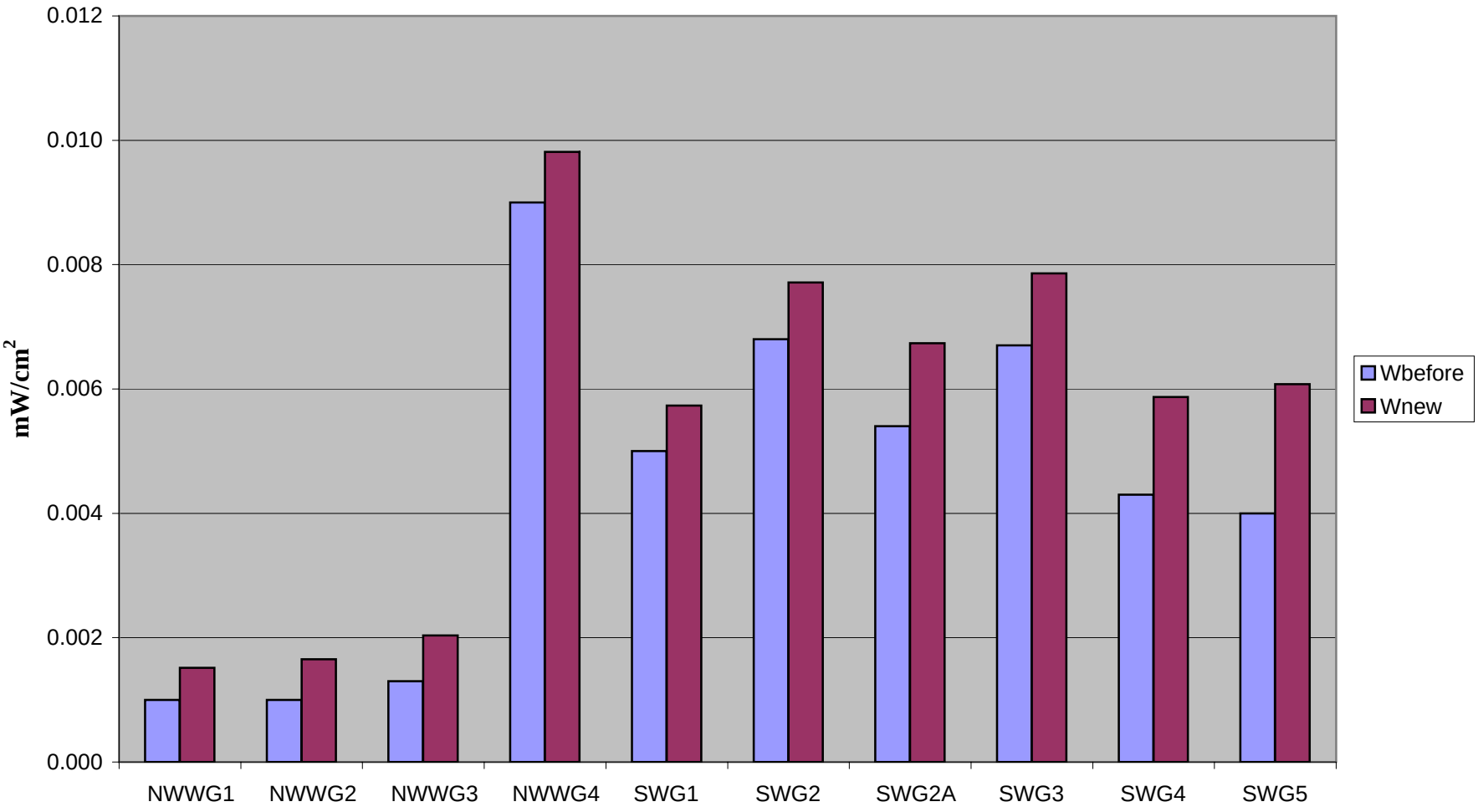


Figure 9

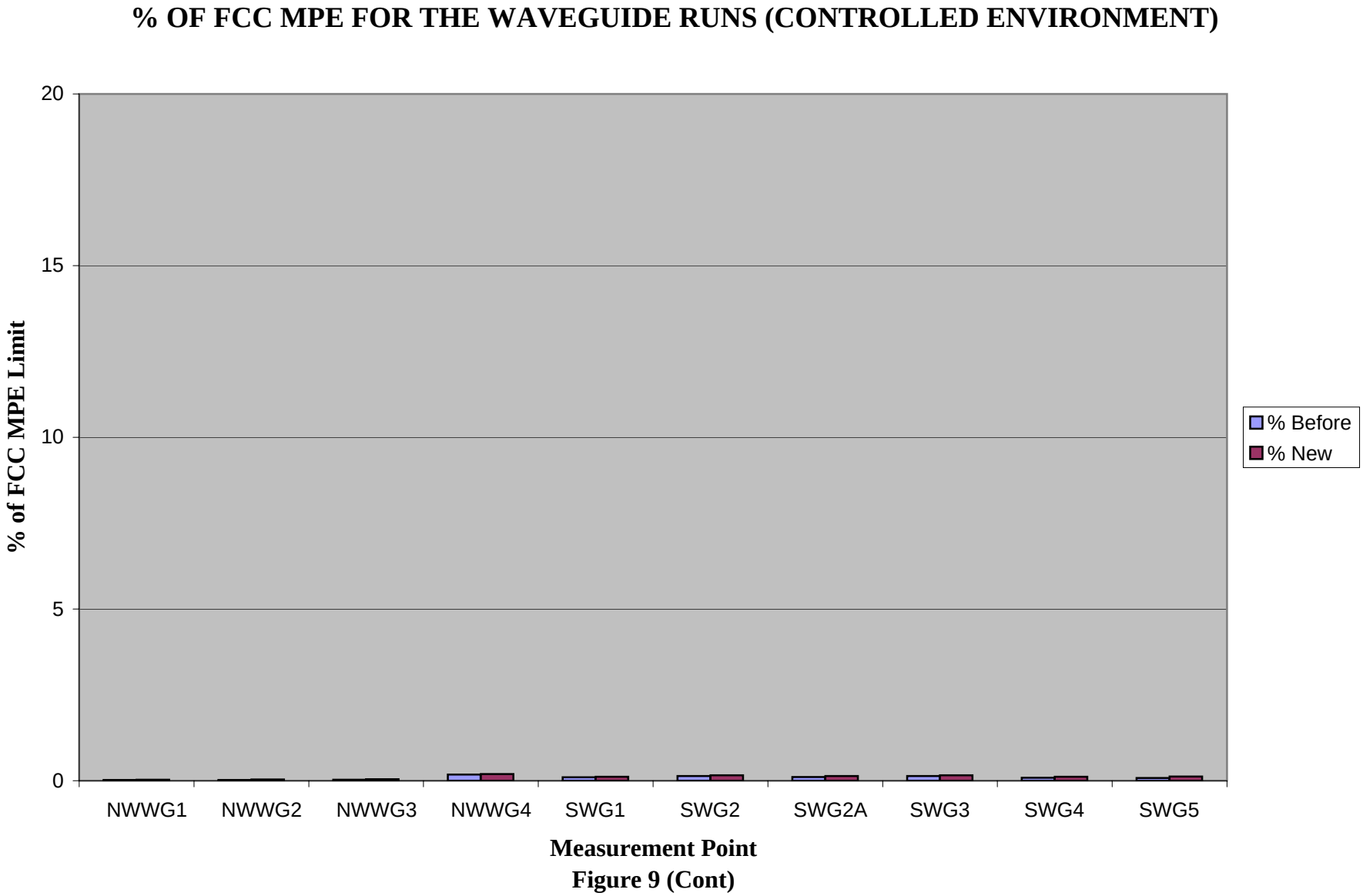


Figure 9 (Cont)

POWER DENSITY OF THE WALKWAYS AND DRIVEWAYS (CONTROLLED ENVIRONMENT)

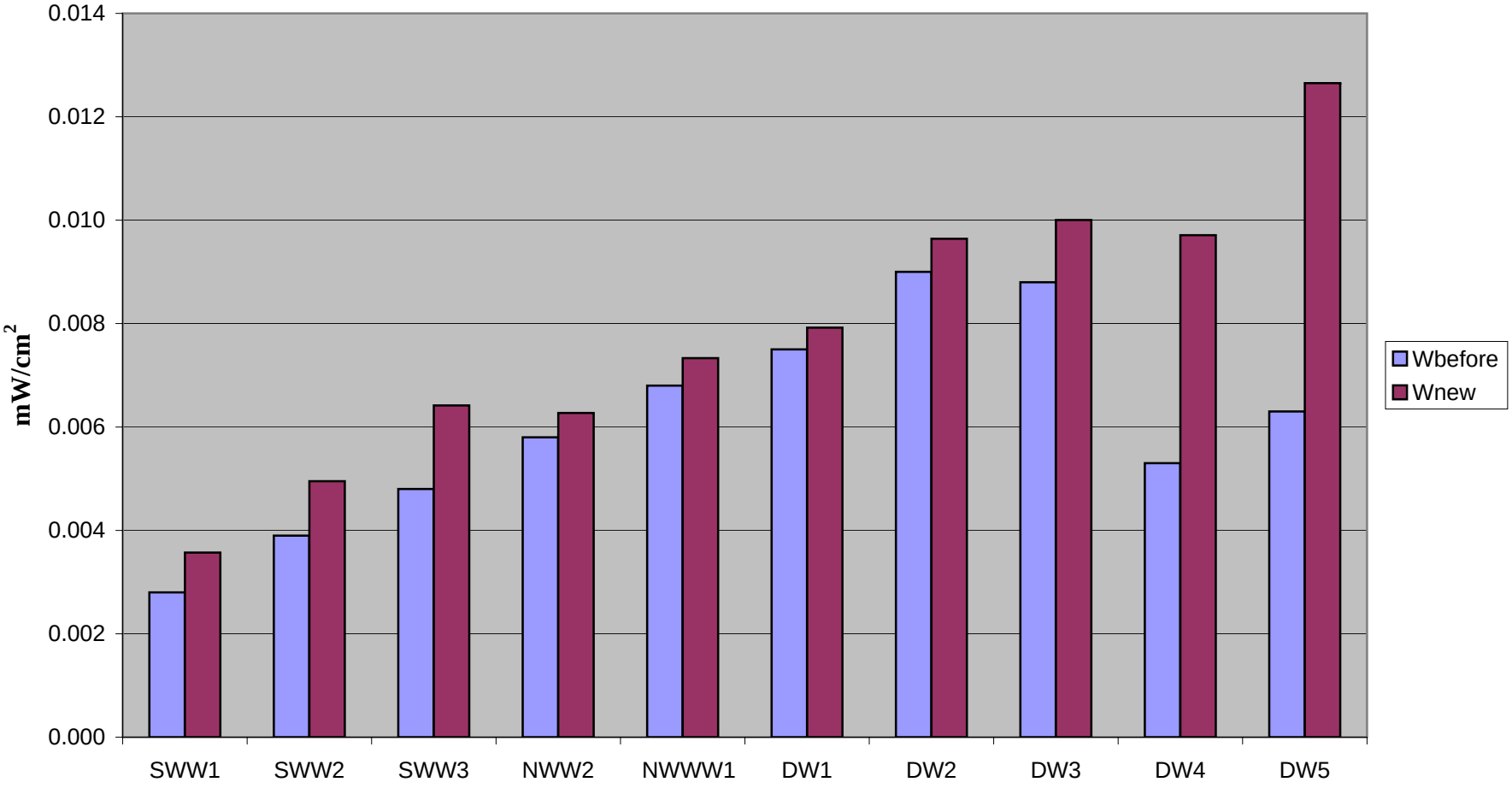


Figure 10

% OF FCC MPE FOR THE WALKWAYS AND DRIVEWAYS (CONTROLLED ENVIRONMENT)

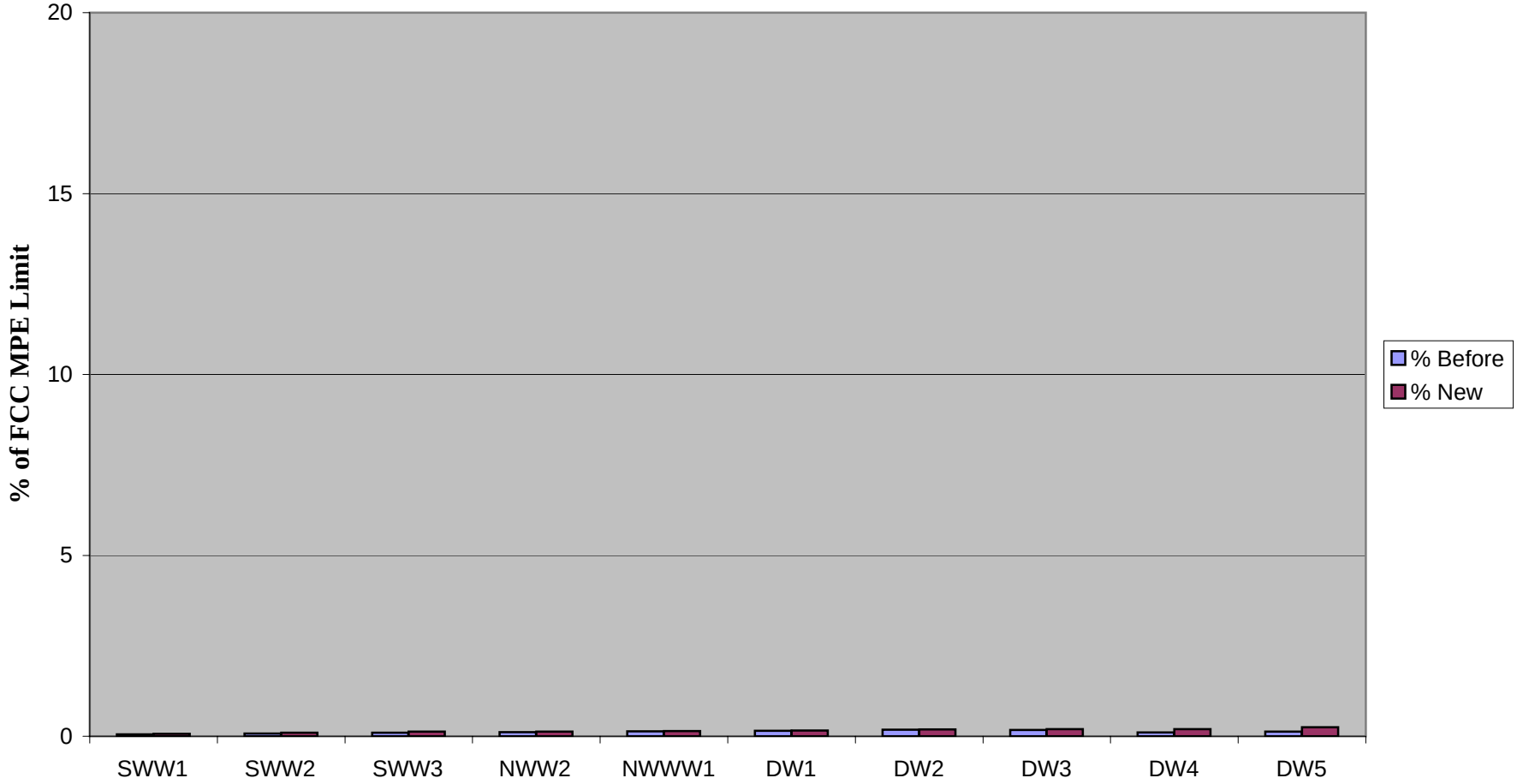
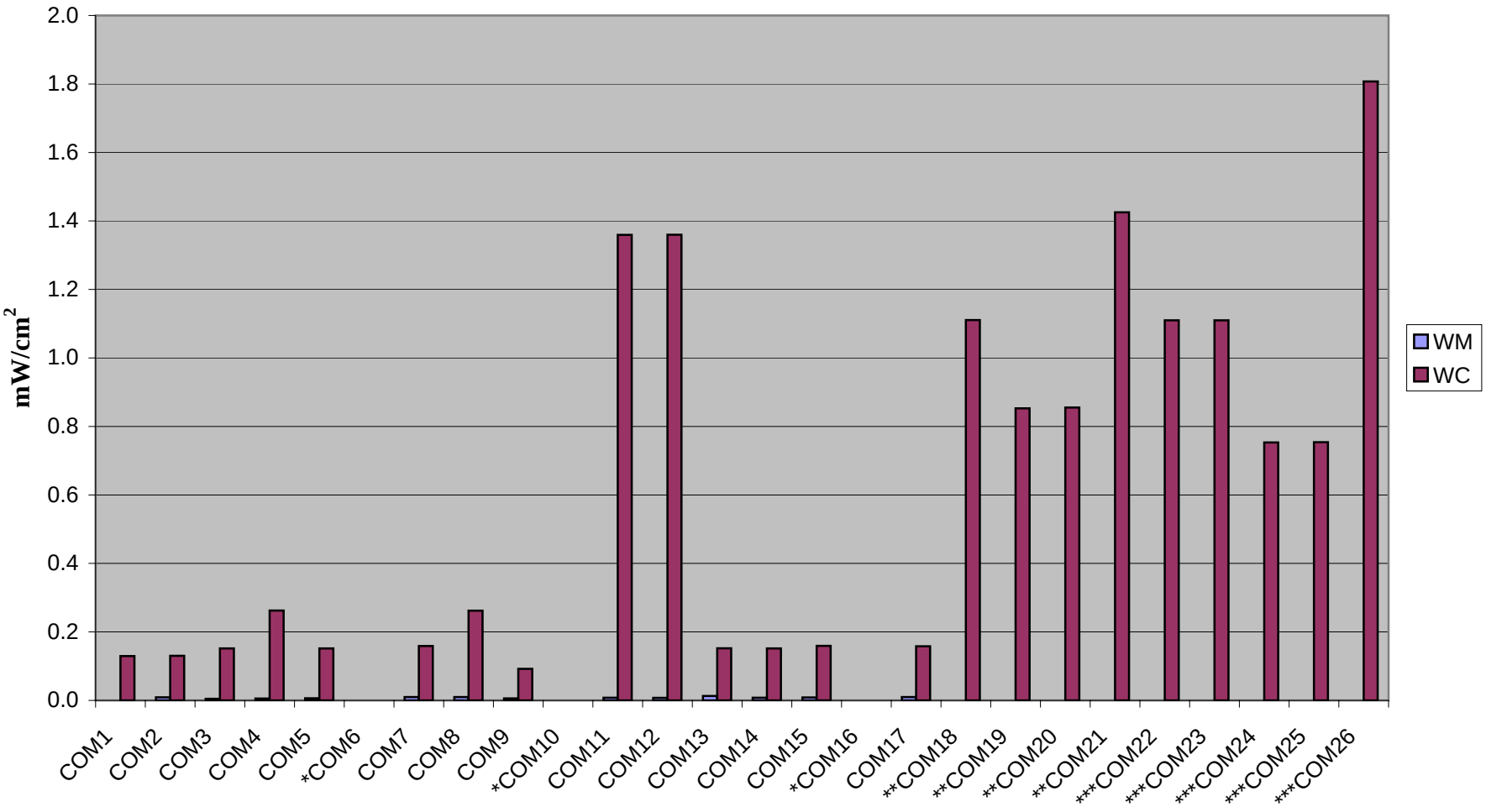


Figure 10 (Cont)

POWER DENSITY IN FRONT OF ANTENNA (CONTROLLED ENVIRONMENT)



Measurement Point

Figure 11

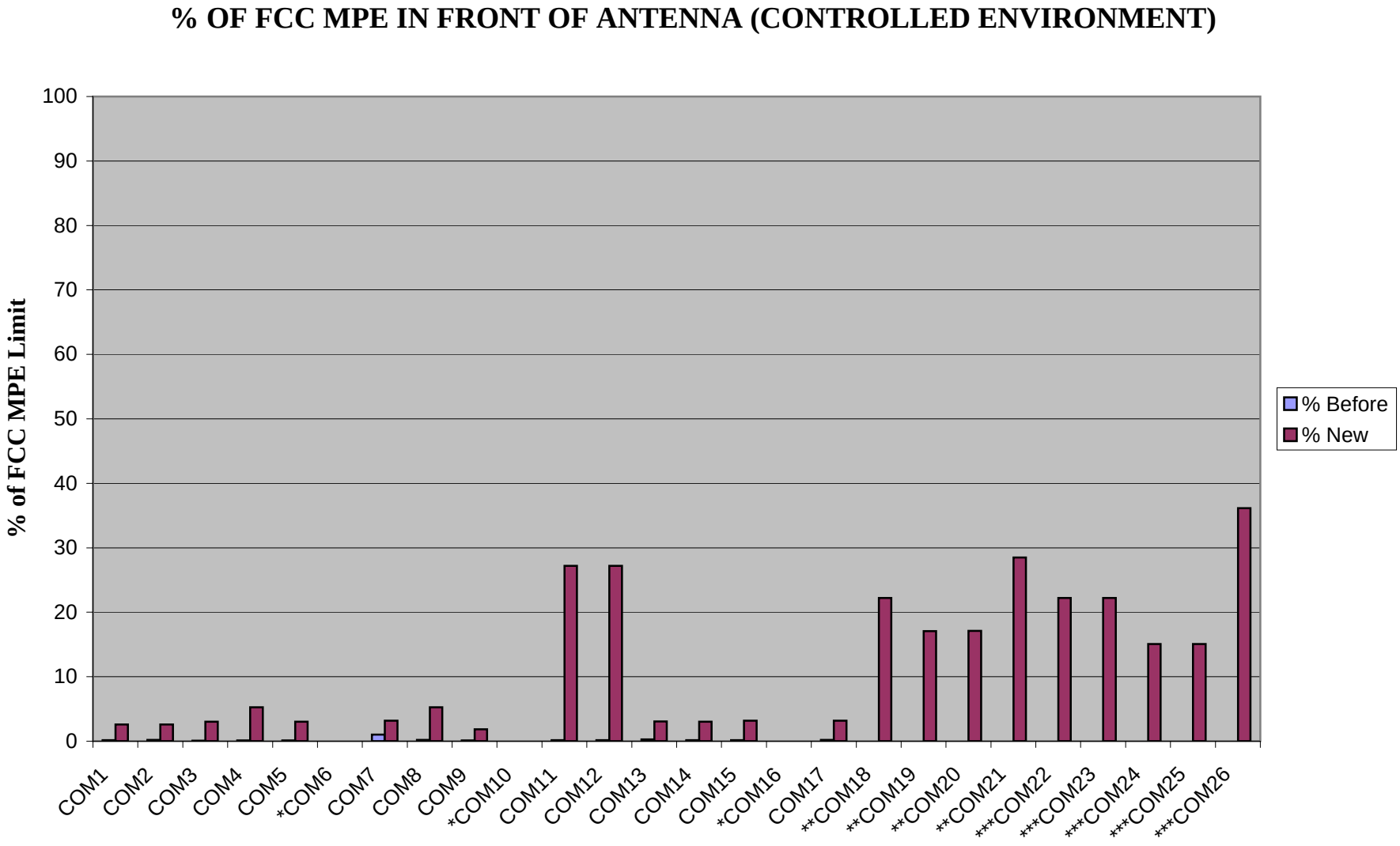


Figure 11 (Cont)

3.2 Analysis of Results

A tabulated summary of the calculated power density levels is presented in Tables 2 through 4. Also, the power density levels are compared graphically in Figures 3 through 11. The calculated power density levels show that in the uncontrolled and controlled areas, the power density levels, (W_{new}) will be a small fraction of the FCC MPE limit taking into account the new systems added after the last measurements and the five systems to be added in the future. The calculated power density levels in front of all the antennas (within the controlled area) are below the FCC MPE limit.

Therefore, for areas within the facility and outside the fence, the earth station transmitting equipment now in operation or planned for in the future will pose no threat to the general public and workers within the facility.

Some of the antennas have hazard levels between their main reflector and feed or sub reflector. Therefore, no maintenance work should be done on any of these antennas while they are still in operation. The calculated power density levels between the main reflector and subreflector of the antennas are all above the FCC MPE limit (5 mW/cm^2). These limits are outlined in Table 5 and graphically represented in Figure 2.

SECTION

FOUR

SECTION 4
CONCLUSIONS

Based on the calculations performed in this study for the Williams Communications facility, the power density levels will not exceed the FCC safety criteria for the uncontrolled and controlled areas with the four added and five planned systems in operation. As long as the site is configured as shown in the drawing (Figure 1) and the earth station systems are operated within the parameters listed in Table 1, there will be no Radiation Hazard as presently defined by the FCC. This is true in the controlled and uncontrolled areas of the Williams Vyvx Communications facility.

Some of the earth station antennas have radiation hazard levels between their main reflector and feed or sub reflector. Therefore, all facility maintenance personnel should be instructed not to perform maintenance on any of the earth station antennas unless the transmitter is secured and locked out while maintenance is performed.