

JAMES B. HATFIELD, PE
BENJAMIN F. DAWSON III, PE
THOMAS M. ECKELS, PE
STEPHEN S. LOCKWOOD, PE
DAVID J. PINION, PE

PAUL W. LEONARD, PE
ERIK C. SWANSON, EIT
THOMAS S. GORTON, PE

HATFIELD & DAWSON
CONSULTING ELECTRICAL ENGINEERS
9500 GREENWOOD AVE. N.
SEATTLE, WASHINGTON 98103

TELEPHONE
(206) 783-9151
FACSIMILE
(206) 789-9834
E-MAIL
hatdaw@hatdaw.com

MAURY L. HATFIELD, PE
CONSULTANT
BOX 1326
ALICE SPRINGS, NT 5950
AUSTRALIA

ENGINEERING REPORT:

**APPLICATION FOR FACILITIES CHANGES
KBPI-FM CHANNEL 294C, 106.7 MHz
DENVER, CO**

JACOR BROADCASTING OF COLORADO, INC.

4/2003

TABLE OF CONTENTS

1. Purpose of Application
2. Allocation Considerations
 - a. FM Channel Study
3. Facilities Proposed
 - a. Facility Description
 - b. Blanketing Contour
 - c. HAAT Calculation
4. Exhibits Per FCC Form 301, Section III-B
 - a. Exhibit B-3 Transmitter Site Map
 - b. Exhibit B-12 Vertical Plane Pattern Plot
 - c. Exhibit B-14 Proposed Coverage Contours
 - d. Exhibit B-16 Protection of Table Mountain Facility
 - e. Exhibit B-17 NIER Analysis
5. FCC Form 301, Section III-B
6. Statement of Engineer

1. Purpose of Application

This Engineering Report is part of an application for facilities changes for FM station KBPI at Denver, Colorado, by Jacor Broadcasting of Colorado, Inc. The proposed operation will be on FM Channel 294C (106.7 MHz) with an effective radiated power of 100 kilowatts (20.00 dBk) at an antenna height above average terrain of 524 meters. The ERP specified is the maximum for Class C facilities at this antenna height, as calculated in accordance with the Commission's Rules.

2. Allocation Considerations

The attached spacing study shows that the proposed operation meets the co-channel and adjacent channel spacing requirements for Class C stations as prescribed in §73.207 of the Commission's Rules.

=====

SEARCH PARAMETERS FM Database Date: 030410
 Channel: 294C 106.7 MHz Page 1
 Latitude: 39 43 58
 Longitude: 105 14 8
 Safety Zone: 50 km
 Job Title: KBPI 294C DENVER

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
KPRB APP	BRUSH CO	BPH-020926ACP	292C3 106.3	15.000 81.0	40-13-02 103-41-46	67.2 SS	142.09 46.09	96 CLEAR
KPRB LIC	BRUSH CO	BLH-010808ABF	292A 106.3	3.000 81.0	40-13-02 103-41-46	67.2	142.09 47.09	95 CLEAR
K292AN LIC	BUENA VISTA CO	BLFT-102	292D 106.3	0.050 864.0	38-44-37 106-13-30	218.1	139.13 0.00	0 TRANS
KRKM-FM1 CP	GRANBY CO	BNPFTB-001120AAO	292D 106.3	0.400 0.0	40-02-24 105-56-11	300.0	68.97 0.00	0 BOOST
KRKM LIC	KREMMLING CO	BLH-000310ACM	292C3 106.3	2.350 315.0	40-00-18 106-26-57	286.7 SS	108.15 12.15	96 CLEAR
KKLI LIC	WIDEFIELD CO	BLH-901205KE	292C2 106.3	1.600 678.0	38-44-41 104-51-46	163.6	114.32 9.32	105 CLOSE
VAC	OLATHE CO	RM-196	293C 106.5	0.000 0.0	38-37-03 107-58-33	243.2	267.22 26.22	241 CLEAR
KBPI LIC	DENVER CO	BLH-851120KC	294C 106.7	100.000 301.0	39-43-59 105-14-12	288.0	0.10 -289.90	290 SHORT
RSV	PUEBLO CO	RM-10098	295C2 106.9	0.000 0.0	38-06-32 104-29-18	160.1	191.56 3.56	188 CLOSE
KNKN APP	PUEBLO CO	BMPH-021122AAC	295C2 106.9	27.500 203.0	38-06-22 104-29-18	160.1	191.86 3.86	188 CLOSE
KNKN CP	PUEBLO CO	BPH-010214ACF	295C2 106.9	27.000 205.0	38-06-32 104-29-18	160.1	191.56 3.56	188 CLOSE
KHEN-LP CP MOD	SALIDA CO	BMPL-020606AAJ	295L1 106.9	0.100 -231.0	38-32-06 105-59-31	206.3	148.19 0.00	0 LPFM
KSIR-FM VAC	BENNETT CO	-	296C 107.1	0.000 0.0	39-54-34 103-27-58	82.0	152.76 47.76	105 CLEAR
KSIR-FM CP MOD	BENNETT CO	BMPH-030109AFL	296C 107.1	92.000 621.0	39-55-22 103-58-18	78.5 SS	110.24 5.24	105 CLOSE

```

=====
SEARCH PARAMETERS                               FM Database Date: 030410
Channel: 294C 106.7 MHz                        Page 2
Latitude: 39 43 58
Longitude: 105 14 8
Safety Zone: 50 km
Job Title: KBPI 294C DENVER
    
```

Call Status	City St	FCC File No.	Channel Freq.	ERP(kW) HAAT(m)	Latitude Longitude	Bearing deg-True	Dist (km)	Req (km)
K296CL LIC	BRECKENRIDGE CO	BLFT-870408TB	296D 107.1	0.050 DA 745.0	39-33-22 106-06-53	255.7	77.97 0.00	0 TRANS
KSIR-FM LIC	BRUSH CO	BLH-950915KB	296C1 107.1	100.000 265.0	40-16-24 104-06-16	57.7 SS	113.72 8.72	105 CLOSE
KSIR-FM1 LIC	HUDSON CO	BLFTB-991227ABB	296D 107.1	20.000 DA 128.0	40-07-15 104-36-13	51.1	69.10 0.00	0 BOOST

44444 END OF FM SPACING STUDY FOR CHANNEL 294 44444

3. Facilities Proposed

a. Facility Description

The proposed KBPI operation will be on Channel 294C (106.7 MHz) with an effective radiated power of 100 kilowatts. Operation is proposed with a 6-element circularly-polarized omni-directional antenna (0.88 wavelength spacing at the KBPI frequency) to be shared with KALC.

The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1044149. The tower owner will be filing an FAA Form 7460-1 to correct the tower site elevation to comport with the recently-completed survey of the Lookout Mountain site. Once an FAA determination of no hazard is received, the FCC Antenna Structure Registration will be updated to match the elevation values in the instant application.

b. Blanketing Contour

The 115 dBu contour for the proposed facilities extends 3.9 kilometers from the tower, based on the calculation methodology shown in §73.318 of the Commission's Rules. Much of the area within the blanketing contour is populated. The height of the proposed antenna above ground and its vertical radiation characteristics should mitigate any adverse effects to nearby residents or other communications facilities. If such adverse effects occur, the applicant will be responsible for their amelioration as prescribed in §73.318, including receiver-induced intermodulation to facilities in existence or authorized or receivers in use prior to grant of this application.

c. HAAT Calculation

The proposed operation is at the Lookout Mountain transmitter site east of Denver, Colorado. Consistent with prior precedent, the average terrain value calculation excludes the four radials which extend primarily over the Rocky Mountains. The Commission has long recognized this method of calculating HAAT in previous cases involving stations in the Denver area, and recently acknowledged the continued need to prevent improper skewing of the antenna HAAT values of stations in the area.¹

Precise average terrain figures for the proposed facility are provided in the attached table. The applicant respectfully requests a waiver of §73.313(d) of the Commission's Rules to permit exclusion of the terrain data on the four radials extending over the Rocky Mountains from the average terrain calculation for this facility.

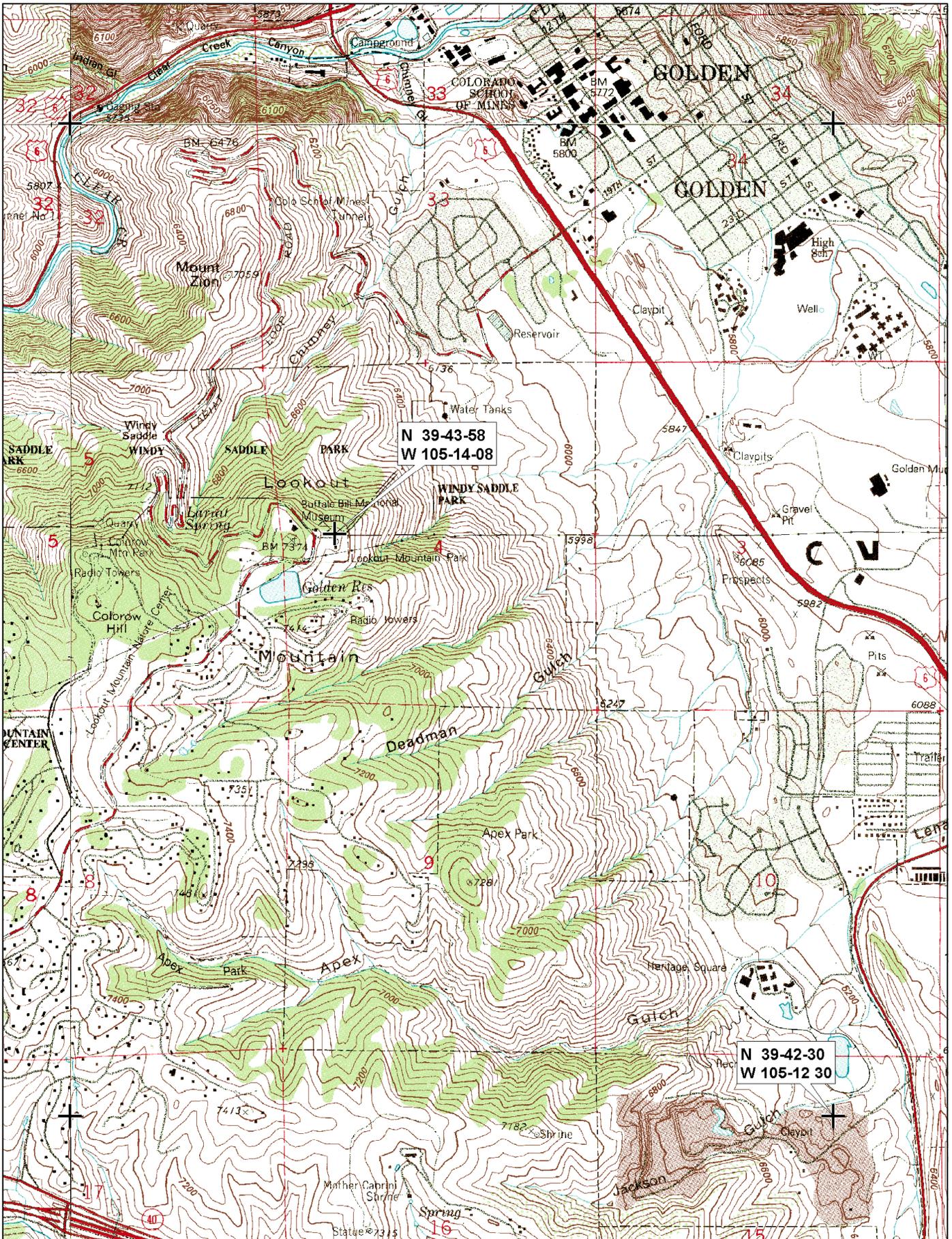
¹Second Report and Order in MM Docket No. 98-93, *Streamlining of Radio Technical Rules in Parts 73 and 74 of the Commission's Rules*, released November 1, 2000.

AVERAGE TERRAIN CALCULATION

Azimuth (degrees True)	Average Terrain
0	1845.7 m
45	1715.0 m
90	1713.1 m
135	1798.9 m
180*	2170.4 m
225*	2274.2 m
270*	2216.6 m
315*	2401.4 m

*Radial extends over the Rocky Mountains and is excluded from the average terrain calculation

Radiation Center 2292 meters AMSL
Average Terrain 1768 meters
HAAT 524 meters



N 39-43-58
W 105-14-08

N 39-42-30
W 105-12-30



© 2002 DeLorme. XMap® 3.5. Data copyright of content owner.
Zoom Level: 13-1 Datum: NAD27

Scale 1 : 24,000
1" = 610 m



ELECTRONICS RESEARCH, INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 2.2

-----THEORETICAL-----
VERTICAL PLANE RELATIVE FIELD

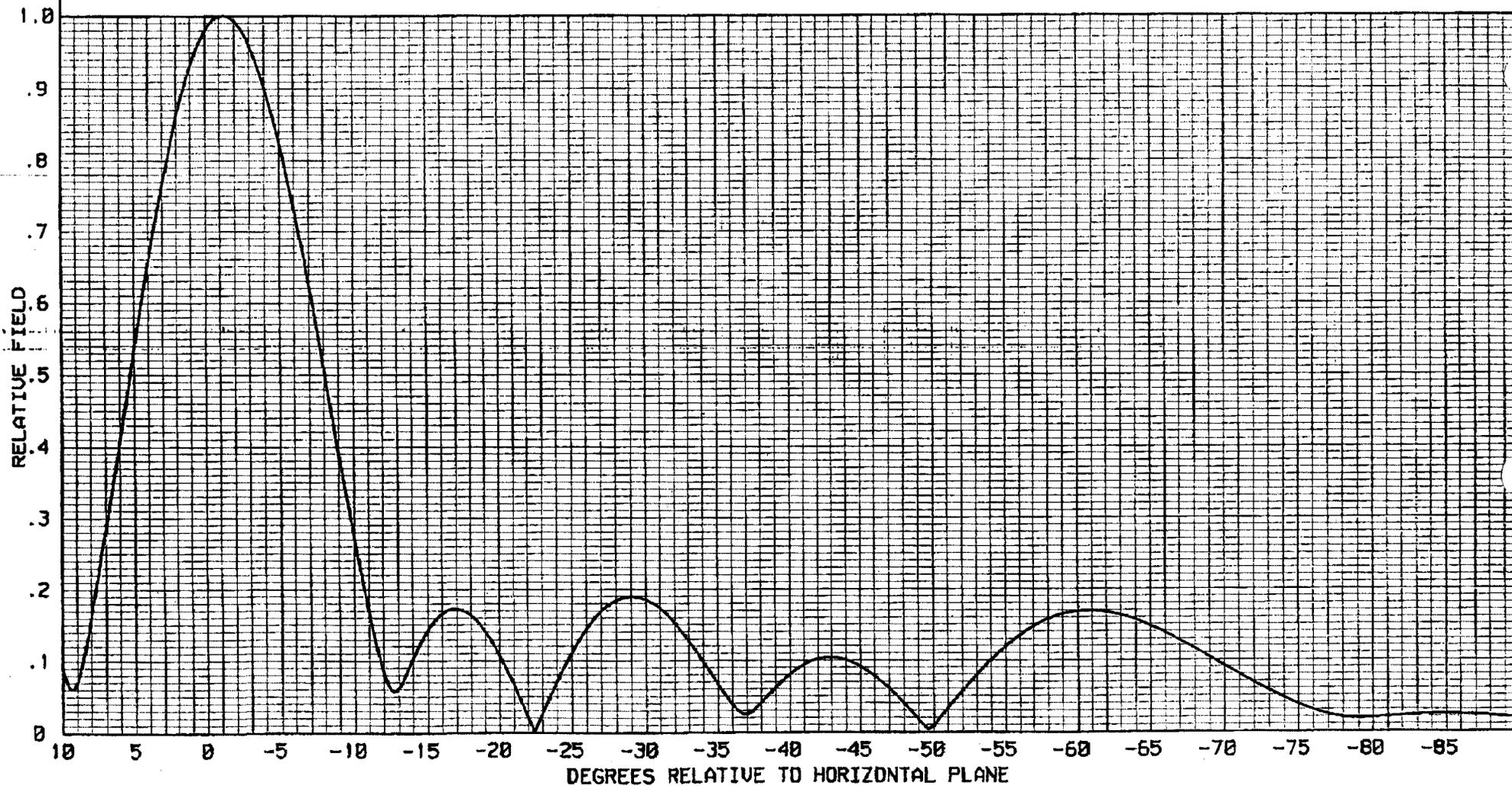
6 ERI TYPE SHP, SHPX, LP, OR LPX ELEMENTS
-1.25 DEGREE(S) ELECTRICAL BEAM TILT
6 PERCENT FIRST NULL FILL
0 PERCENT SECOND NULL FILL

POWER GAIN IS 2.951 IN THE HORIZONTAL PLANE (3.080 IN THE MAX.)

MARCH 26, 2002

106.7 MHz

ELEMENT SPACING
96.8125 INCHES



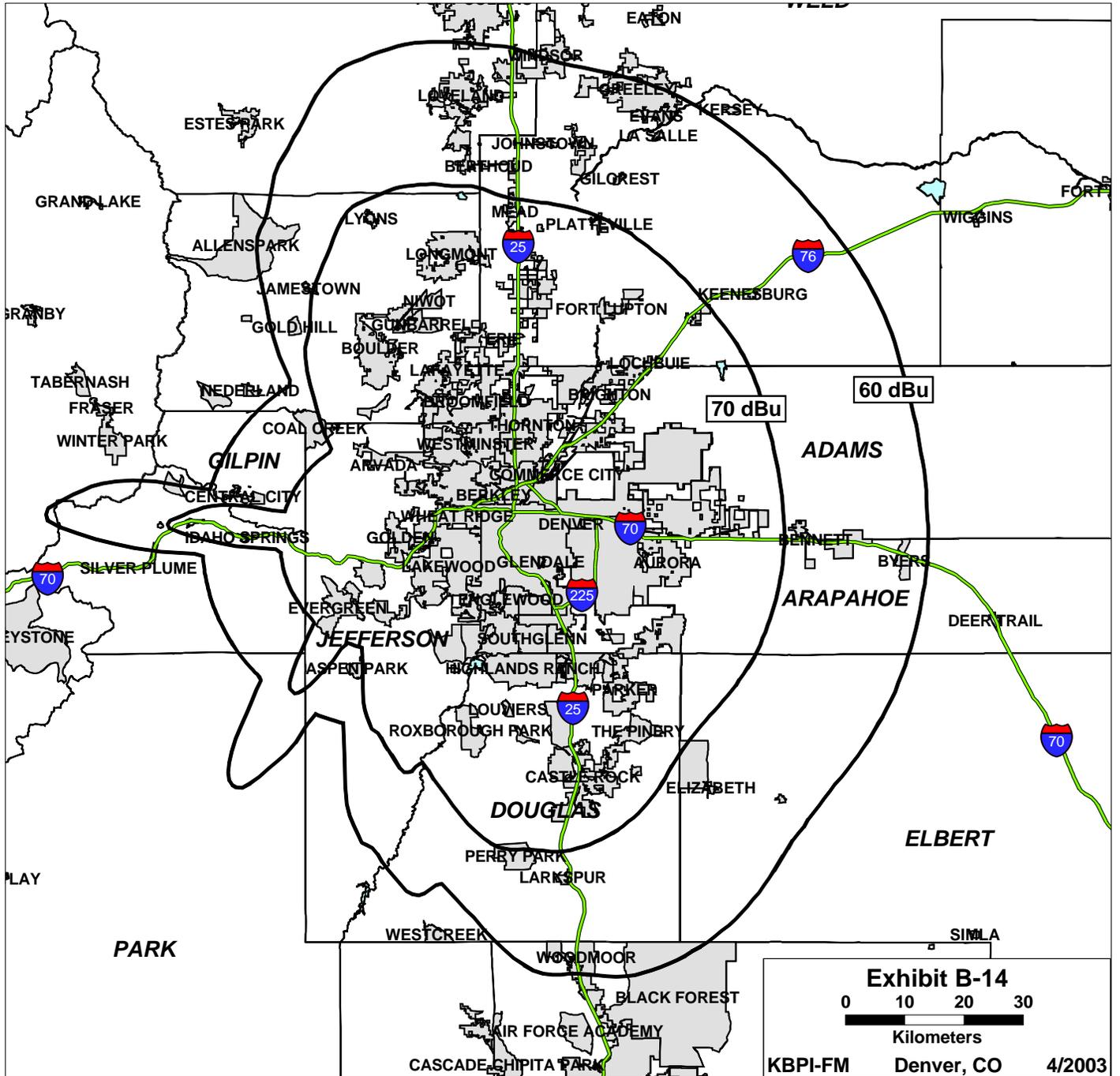


Exhibit B-14

0 10 20 30

Kilometers

KBPI-FM Denver, CO 4/2003

Exhibit B-16
Protection of Table Mountain Radio Receiving Zone
KBPI-FM 294C Denver, Colorado

The requirements of §1.924(b) of the Commission's Rules require that new or changed facilities of FM broadcast stations located in the vicinity of the Table Mountain Radio Receiving Zone of the Research Laboratories of the Department of Commerce located in Boulder County, Colorado, maintain a field strength value of 80 dBu/Vm or less, except as noted in the following table.

The propagation path from the proposed KBPI facilities has been evaluated using a variety of propagation models, and the radiation pattern of the existing authorized antenna has been carefully reviewed. From this data, a specific value of effective radiated power can be determined which would overprotect Table Mountain, but there is at least 2 dB of ambiguity in this analysis. Therefore, a specific directional antenna pattern design for the purpose has not been proposed.

The antenna pattern proposed in this application is omnidirectional, but the tower on which the antenna will be mounted has a very wide cross-section (approximately 11 feet) in the aperture of the antenna. Under these circumstances, there will be at least 2 to 3 dB of scalloping of the antenna pattern. If measurements after construction show that the measured field value at the Table Mountain location exceeds the maximum allowable, the antenna mounting has been configured to allow reorientation of the antenna to use its natural mildly scalloped radiation pattern to effect the necessary change in signal strength at Table Mountain.

**GRANDFATHERED RADIO/TV STATIONS
TABLE MOUNTAIN MAXIMUM PERMISSIBLE MEASURED SIGNAL LEVELS**

Call Sign	Frequency	Location	Mean		Maximum*	
			mV/m	dBuV/m	mV/m	dBuV/m
KLMO-FM	1060 kHz	Longmont	61.13	95.73	72.66	97.23
KRKS-FM	94.7 MHz	Boulder	16.30	84.24	18.99	85.57
KOSI-FM	101.1 MHz	Lookout Mtn	16.30	84.24	19.37	85.74
KRFX-FM	103.5 MHz	Lookout Mtn	12.90	82.21	15.33	83.71
KQKS-FM	104.3 MHz	Longmont	37.88	91.57	45.02	93.07
KBPI-FM	106.7 MHz	Lookout Mtn	22.40	87.00	26.62	88.50
KCNC-TV	67.25 MHz	Lookout Mtn	13.46	82.58	16.00	84.08
KRMA-TV	83.25 MHz	Lookout Mtn	10.30	80.26	12.24	81.76
KMGH-TV	175.25 MHz	Lookout Mtn	44.07	92.88	52.37	94.38
KUSA-TV	187.25 MHz	Lookout Mtn	43.58	92.79	51.79	94.28

*Maximum is mean times 1.5 dB

Exhibit B-17
NIER Analysis for:
KFMD-FM 239C Denver, Colorado
KRFX-FM 278C Denver, Colorado
KALC-FM 290C Denver, Colorado
KBPI-FM 294C Denver, Colorado

Facilities Proposed

The following ground-level NIER analysis pertains to facilities change applications being filed by four FM stations operating from the Lookout Mountain transmitter site.

The proposed KFMD operation will be on Channel 239C (95.7 MHz) with a maximum lobe effective radiated power of 100 kilowatts. Operation is proposed with an 8-level circularly-polarized directional panel antenna (0.75 wavelength spacing at the KFMD frequency) to be shared with KRFX. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1033691.

The proposed KRFX operation will be on Channel 278C (103.5 MHz) with a maximum lobe effective radiated power of 100 kilowatts. Operation is proposed with an 8-level circularly-polarized directional panel antenna (0.81 wavelength spacing at the KRFX frequency) to be shared with KFMD. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1033691.

The proposed KALC operation will be on Channel 290C (105.9 MHz) with an effective radiated power of 100 kilowatts. Operation is proposed with a 6-element circularly-polarized omni-directional antenna (0.87 wavelength spacing at the KALC frequency) to be shared with KBPI. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1044149.

The proposed KBPI operation will be on Channel 294C (106.7 MHz) with an effective radiated power of 100 kilowatts. Operation is proposed with a 6-element circularly-polarized omni-directional antenna (0.88 wavelength spacing at the KBPI frequency) to be shared with KALC. The antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1044149.

Tower Registration

The KALC/KBPI antenna will be side-mounted on an existing tower at the Lookout Mountain transmitter site east of Denver. The FCC Antenna Structure Registration Number for the tower is 1044149. The tower owner will be filing an FAA Form 8460-1 to correct the tower site elevation to comport with the recently-completed survey of the Lookout Mountain site. Once an FAA determination of no hazard is received, the FCC Antenna Structure Registration will be updated to match the elevation values in the instant application.

NIER Considerations

Several of the FM stations licensed with transmitter locations on Lookout Mountain have operated with Special Temporary Authority at reduced power for the last several months due to isolated instances where measurements of non-ionizing radiation density have exceeded the Commission's environmental threshold levels for general public exposure (47CFR1.1310). One of the underlying purposes of this group of concurrent applications for facilities changes for KFMD, KRFX, KALC, and KBPI is to provide antenna installations which sharply reduce ground-level non-ionizing radiation density levels. This has been accomplished by careful selection of horizontal plane and vertical radiation patterns, using antenna systems with reduced vertical interbay spacings. The implementation of Advanced Digital Television service by the television stations located on the site used by KALC and KBPI (which is owned by Tribune Corporation, licensee of KWGN-TV) has also resulted in antenna system changes by KWGN-TV, K33DN, and K57BT.

K33DN holds a construction permit to change to Channel 48 at a transmitter site 32 km from Lookout Mountain, and has filed an application to locate the Channel 48 operation at a transmitter site 12 km from Lookout Mountain. Therefore, since the instant NIER analysis has been made based on the “final configuration” of station changes at this transmitter site, K33DN has been excluded from this analysis. Additional broadcast stations operating from transmitter sites in excess of 1000 feet from the proposed FM operations are sufficiently distant that the operation of those additional stations have negligible impact on the ground-level NIER levels in the vicinity of the FM towers, and those stations are therefore excluded from this analysis.

The resulting analysis is shown below. All of the antennas, antenna locations, effective radiated powers and other technical details assume the final post-construction facilities for all those stations which are proposed to be modified. Therefore it is anticipated that the Media Bureau will wish to issue specific Special Temporary Authority grants to each station to facilitate the construction process and for the “program test authority,” conditioned on actual measurement of ground level NIER values, and requiring reduced power operation if necessary until all changes have been accomplished and measurements confirm the reduction of levels to below the public standard in all publicly accessible areas.

The analysis below uses as its geographic database a digitized survey of the area surrounding the KFMD/KRFX antenna site, showing buildings, towers, surface features, and topography at 5 foot intervals. The assumptions and caveats recommended by OET-65 as revised have been employed in the analysis. As a calibration technique, existing antenna operations were modeled in the same fashion, and the results compared well with the measured values of NIER shown in the reports “Baseline RF Exposure Measurements Taken March 4, 2002, Lookout Mountain, Vicinity of KWGN-TV and KFMD Broadcast Towers” and “Electromagnetic Field Measurements at Publicly Accessible Areas near the KHIH-FM Tower Site on Lookout Mountain, Colorado” dated April 19, 2000².

²The call letters of station KHIH-FM are now KFMD-FM.

According to this analysis, no location is predicted to have a maximum combined exposure (spatially averaged) of more than 36% of the uncontrolled environment standard.

Public access to the tower sites is restricted and the antenna towers are posted with warning signs. Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any tower maintenance work is undertaken.

The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency radiation in excess of FCC guidelines.

NIER Calculations

EXPOSURE HEIGHT = 2.0 METERS
 GRID SPACING = 5.0 METERS
 PERCENT-OF-LIMIT VALUES (GRID DIMENSIONS IN METERS):

-025	+000	+025	+050	+075	+100	+125	
+025	. . . - - + + + + + + + + + + + + + + - - - - - - - - - - - - - - +025						
+020	. . . - - + + + + + + + + + + + + + + - - - - - - - - - - - - - - +020						
+015	. . . - - - + + + + + + + + + + + + + + - - - - - - - - - - - - - - +015						
+010	. . . . - - + + + + + + + + + + + + + + - - - - - - - - - - - - - - +010						
+005	. . . . . - + + + + + + * * * * + + + + + - - - - - - - - - - - - - - +005						
+000	. . . . . X + + * * + + * * * * + + + + + - - - - - - - - - - - - - - +000						
-005	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -005						
-010	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -010						
-015	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -015						
-020	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -020						
-025	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -025						
-030	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -030						
-035	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -035						
-040	. . . . . - + + * * + + * * * * + + + + + - - - - - - - - - - - - - - -040						
-045	. . . . . - + + * * + + * * * * X * * * * * + + + + + - - - - - - - - - -045						
-050	. . . . . - + + * * + + * * * * * * * * + + + + + - - - - - - - - - - -050						
-055	. . . . . - + + * * + + * * * * * * * * X * * + + + + + - - - - - - - - -055						
-060	. . . . . - + + * * + + * * * * * * * * + + + + + - - - - - - - - - - -060						
-065	. . . . . + + + + + + + + + + * + * * * * * * + + + + + - - - - - - - - - -065						
-070	. . . . . + + + + + + + + + + * * * * * * * * + + + + + - - - - - - - - -070						
-075	. . . . . + + + + + + + + + + * * * * * * * * + + + + + - - - - - - - - -075						
-080	. . . . . + + + + + + + + + + * * * * * * * * + + + + + - - - - - - - - -080						
-085	. . . . . + + + + + + + + + + * * * * * * * * + + + + + - - - - - - - - -085						
-090	. . . . . + + + + + + + + + + + + + + + + + + + + + + - - - - - - - - -090						
-095	. . . . . + + + + + + + + + + + + + + + + + + + + + + - - - - - - - - -095						
-100	. . . . . - - - + + + + + + + + + + + + + + + + + + + + - - - - - - - - -100						
-105	. . . . . - - - - + + + + + + + + + + + + + + + + + + + - - - - - - - - -105						
-110	. . . . . - - - - - + + + + + + + + + + + + + + + + + + - - - - - - - - -110						
-115	. . . . . - + - - - - + + + + + + + + + + + + + + + + + - - - - - - - - -115						
-120	. . . . . - + - - - - - + + + + + + + + + + + + + + + + - - - - - - - - -120						
-125	. . . . . + - + - - - - - + + + + + + + + + + + + + + + - - - - - - - - -125						
-025	+000	+025	+050	+075	+100	+125	

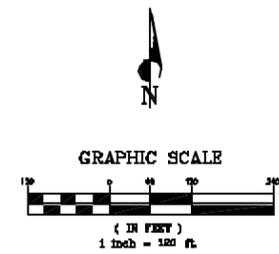
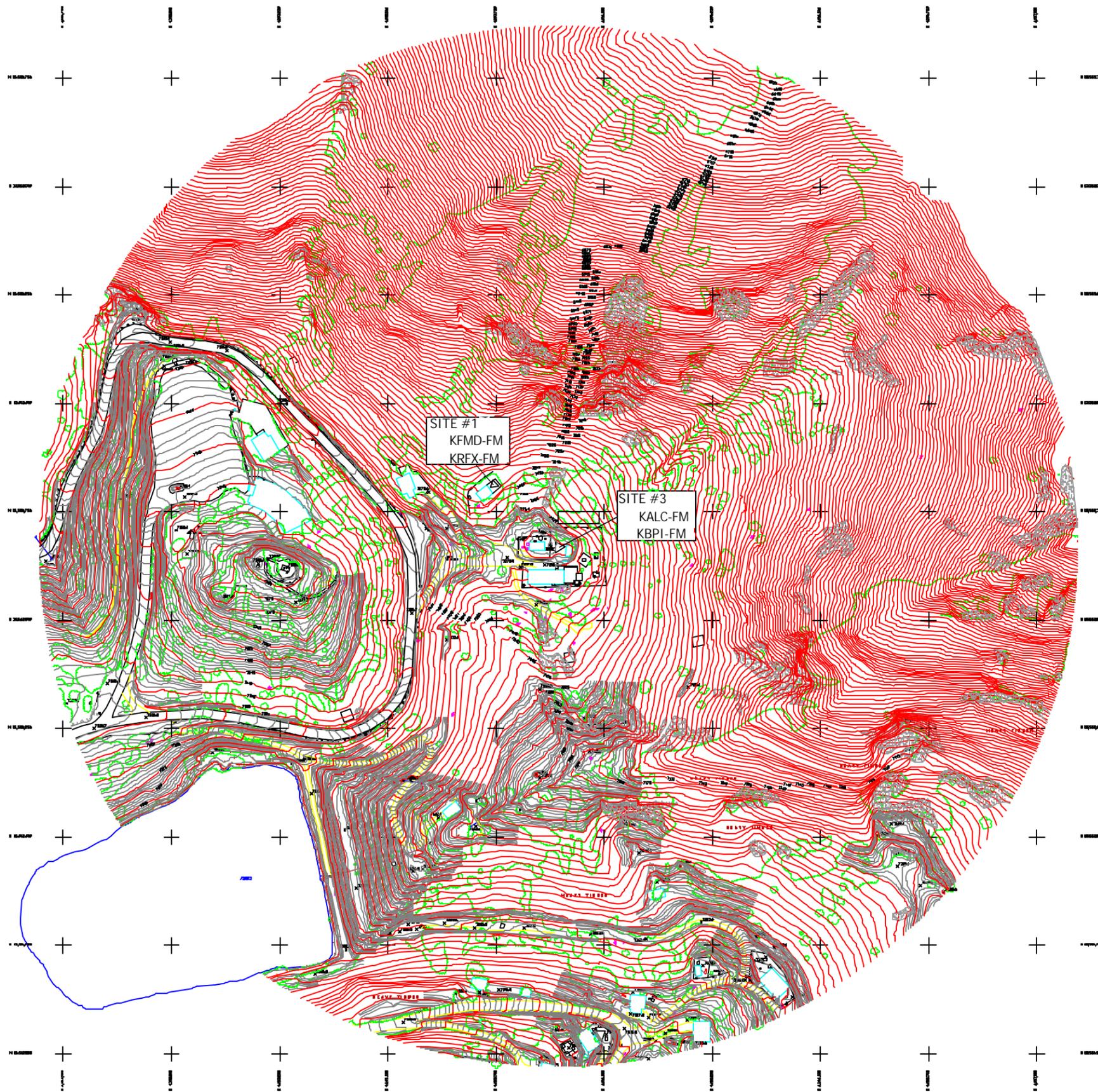
TABLE OF STATION DATA

STATION	FREQ. (MHz)	X(m)	Y(m)	ERP(kw)	HT. (m)	ANTENNA	SPACING	M.P.E.
KFMD DA	95.700	0.0	0.0	200.000	2256.0	8 lvl panel	0.746	0.200
KRFX DA	103.500	0.0	0.0	200.000	2256.0	8 lvl panel	0.807	0.200
KALC ND	105.900	45.6	-43.8	200.000	2292.0	6 bay roto	0.868	0.200
KBPI ND	106.700	45.6	-43.8	200.000	2292.0	6 bay roto	0.874	0.200
KWGN-TV	55.250	45.6	-43.8	46.000	2342.0	RCA TF-4BL		0.200
KCEC-TV	687.250	45.6	-43.8	1155.000	2256.0	Bog BUI32N		0.458
K57BT	729.260	45.6	-43.8	22.490	2236.0	And ALP-16L6		0.486
KTFD-LP	645.260	63.0	-52.7	13.920	2242.0	Bog B16UC		0.430

SPATIALLY AVERAGED: (BLANK) LESS THAN 1% OF UNCONTROLLED AREA M.P.E.
 . 1% TO LESS THAN 5%
 - 5% TO LESS THAN 10%
 + 10% TO LESS THAN 20%
 * 20% TO LESS THAN 50%
 # 50% TO LESS THAN 100%
 & 100% TO LESS THAN 500%
 @ 500% TO LESS THAN 1000%
 M 1000% OR HIGHER
 X TOWER LOCATION

TABLE OF INDIVIDUAL STATION MAXIMA						
STATION	FREQ. (MHz)	X(m)	Y(m)	PEAK(%)	S.A.(%)	%@BASE OF TOWER
KFMD DA	95.700	20.0	-35.0	11.691	10.908	6.455
KRFX DA	103.500	10.0	-20.0	13.932	13.372	7.058
KALC ND	105.900	45.6	-43.8	3.896	3.795	3.534
KBPI ND	106.700	45.6	-43.8	4.067	3.961	3.690
KWGN-TV	55.250	-25.0	-45.0	0.232	0.228	0.016
KCEC-TV	687.250	55.0	-45.0	11.700	11.117	4.813
K57BT	729.260	50.0	-40.0	14.009	12.567	2.154
KTFD-LP	645.260	85.0	-55.0	0.259	0.238	0.003
MAXIMUM EXPOSURE		50.0	-50.0		35.700	

TOPOGRAPHIC SURVEY



REVISIONS:

PROFESSIONAL LAND SURVEYORS
 12860 W. CEDAR DR. ST. 200A, LAKEWOOD, CO 80228
 PHONE (303) 984-7655 FAX (303) 984-7656

G310039.DWG

Drawn L.F.F.

Check P.C.M.

Scale 1"=120'

TOPOGRAPHIC SURVEY

KHH RADIO
 JEFF GULICK
 LOOK OUT MOUNTAIN ROAD
 303-713-8840

Job No. G310039

Date: 10-06-00

SHEET 1 OF 1

Statement of Engineer

This Engineering Report, which is part of an application for facilities changes for FM station KBPI at Denver, Colorado, has been prepared by the undersigned. All representations contained herein are true to the best of my knowledge. I am a technical consultant in the firm of Hatfield and Dawson Consulting Engineers, and am enrolled as an EIT in the State of Washington.

Signed this 23rd day of April, 2003.

/S/

Erik C. Swanson