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ENGINEERING REPORT:

**APPLICATION FOR MINOR MODIFICATION OF CONSTRUCTION PERMIT
NON-COMMERCIAL/EDUCATIONAL DIGITAL TV STATION
KEPB-DT
CHANNEL 29**

EUGENE, OREGON

OREGON PUBLIC BROADCASTING

JULY 2003

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1. Purpose of Application

This Engineering Report is part of an application for minor modification of construction permit BPEDT-20000426ABL for NCE digital television station KEPB-DT at Eugene, Oregon, by Oregon Public Broadcasting. The proposed operation will be on UHF Channel 29 with a maximum lobe effective radiated power of 100 kW (20.00 dBk) at an antenna height above average terrain of 403 meters.

2. Allocation Considerations

Please See Exhibit 11 for a complete discussion of the allocation considerations for the proposed facility.

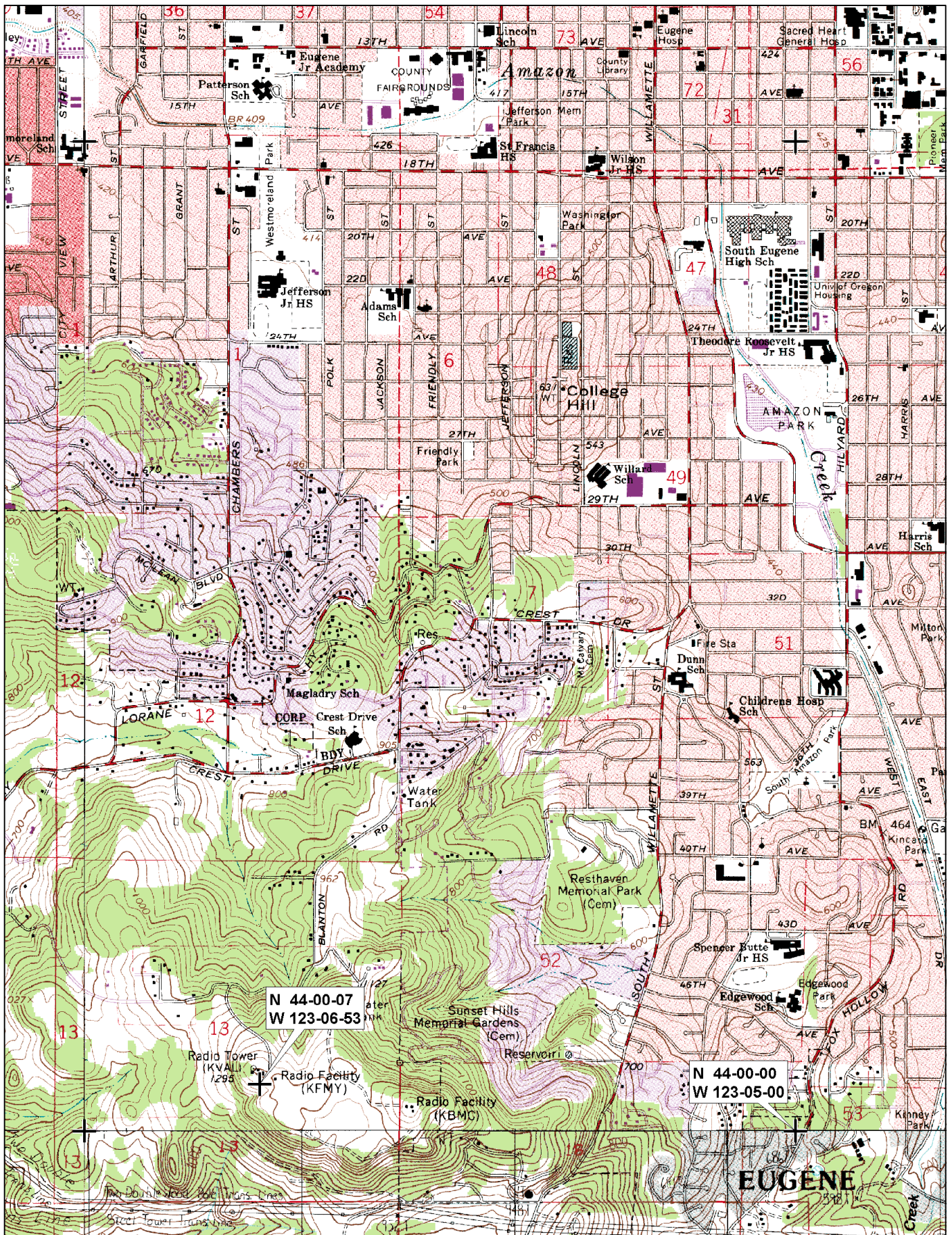
3. Facilities Proposed

a. Facility Description

The proposed operation will be on UHF Channel 29 (560-566 MHz) with a maximum lobe effective radiated power of 100 kilowatts at 1.5 degrees of electrical beam tilt. Maximum power at the radio horizon will be 75 kW (18.75 dBk). Operation is proposed with a horizontally polarized Andrew ATW16H8-HSC3L-28H antenna, mounted on an existing tower at Blanton Heights in Eugene. The FCC Antenna Structure Registration Number for this tower is #1033594.

b. Statement of Responsibility

The station will assume full responsibility for the adjustment of reasonable complaints arising from interference caused by excessively strong signals from its operation per §73.685(d) of the Commission's Rules. Some 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 effects occur, the applicant will be responsible for their amelioration as prescribed in §73.685(d) and (g), including receiver-induced intermodulation to facilities in existence or authorized or receivers in use prior to grant of this application.



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Zoom Level: 13-1 Datum: NAD27

Scale 1 : 24,000
1" = 610 m

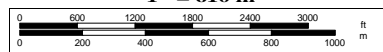


Exhibit 10
KEPB-DTV Ch. 29 Eugene, Oregon
Directional Antenna

Oregon Public Broadcasting proposes to construct the modified KEPB-DT facility using an Andrew ATW16H8-HSC3L-28H slot antenna oriented at zero degrees True. The proposed directional antenna pattern has a ratio of maximum to minimum radiation which exceeds 15 dB at several azimuths. Specifically, the 15 dB ratio is exceeded for the azimuth spans of 150 to 166 degrees True and 194 to 210 degrees True. The pattern minimum is -15.7 dB, which occurs at 156 to 158 degrees True and 202 to 204 degrees True.

The proposed transmitter site is located on a ridgeline at the south end of the Willamette Valley. South of this location, two mountain ranges (the Coast Range and the Cascade Range) effectively merge to form an area of very rough and rugged terrain with isolated towns and settlements located along the various tributaries of the Willamette River. The vast majority of this territory is unpopulated, and much is national forest or state forest land.

The directional antenna pattern specified herein has been designed to provide maximum signal strength to the populated areas of Eugene and Springfield and the Willamette Valley to the north, while still providing sufficient signal strength to the communities immediately to the south, including Creswell and Cottage Grove. At the same time, this pattern minimizes "wasted" signal over the azimuth spans listed above, in which lie largely unpopulated and inhospitable regions of mountainous terrain.

It should be noted that the maximum to minimum ratio specified herein is not necessary to ensure interference protection to any NTSC or digital station, and that the requested maximum to minimum ratio is only nominally (less than 1 dB) beyond that normally permitted for UHF television stations.

Grant of the instant application will enable Oregon Public Broadcasting to implement NTSC and digital operation of KEPB-TV/DT via a common antenna system. Oregon Public Broadcasting believes that the proposed facility provides the best balance of cost and coverage, and is highly motivated to begin construction promptly upon grant of a construction permit.

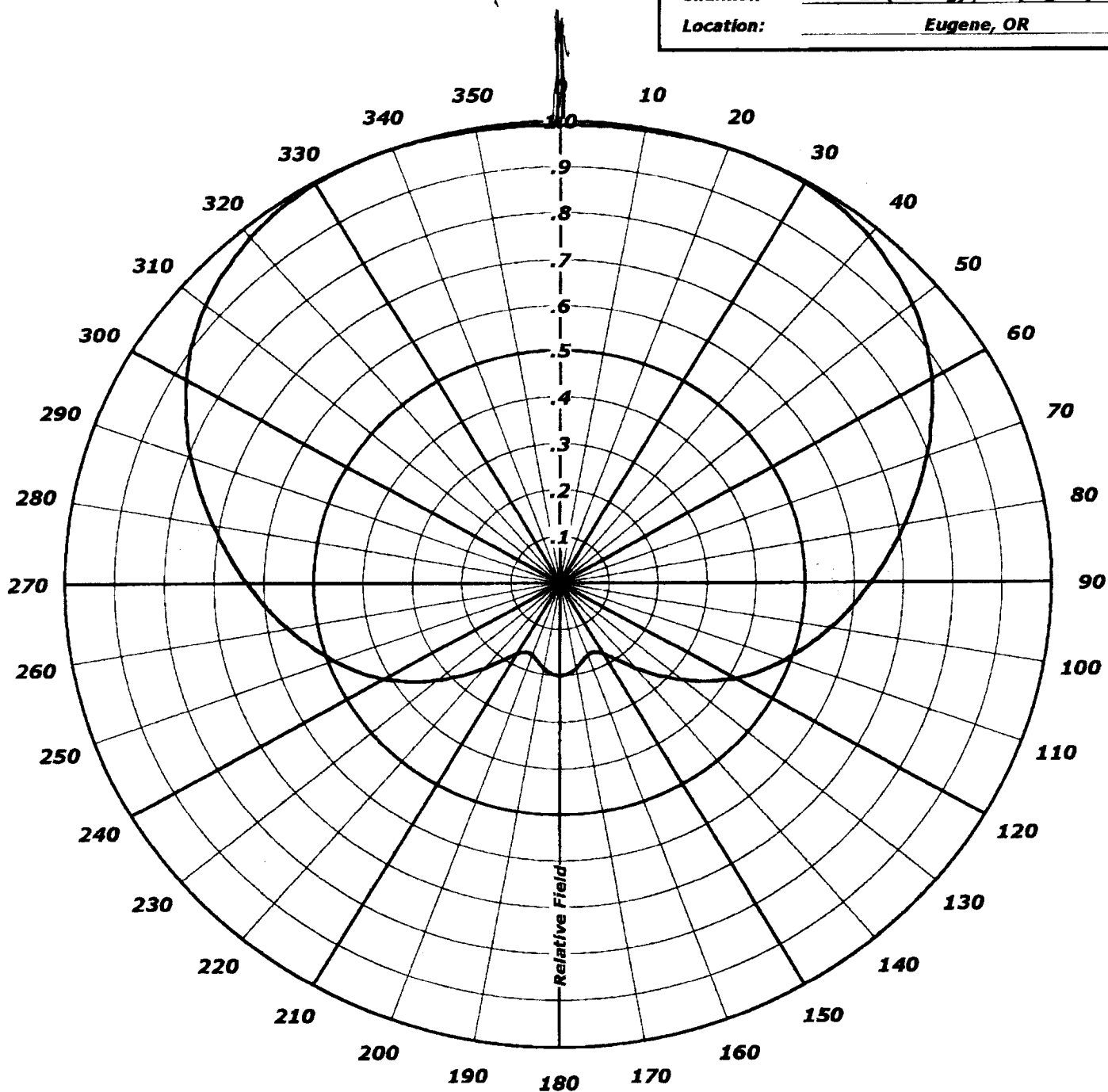
Therefore, Oregon Public Broadcasting respectfully requests waiver of §73.685(e) of the Commission's Rules with respect to the ratio of maximum to minimum radiation specified in the instant application.

ANDREW
AZIMUTH PATTERN

Type: CH2829AZ-H-BID-C3

	Numeric	dBd
Directivity:	2.09	(3.20)
Peak(s) At:		
Polarization:	Horizontal	
Channel:	28 (Analog) / 29 (Digital)	
Location:	Eugene, OR	

True!




TABULATED DATA FOR AZIMUTH PATTERN
TYPE : CH2829AZ-H-BID-C3

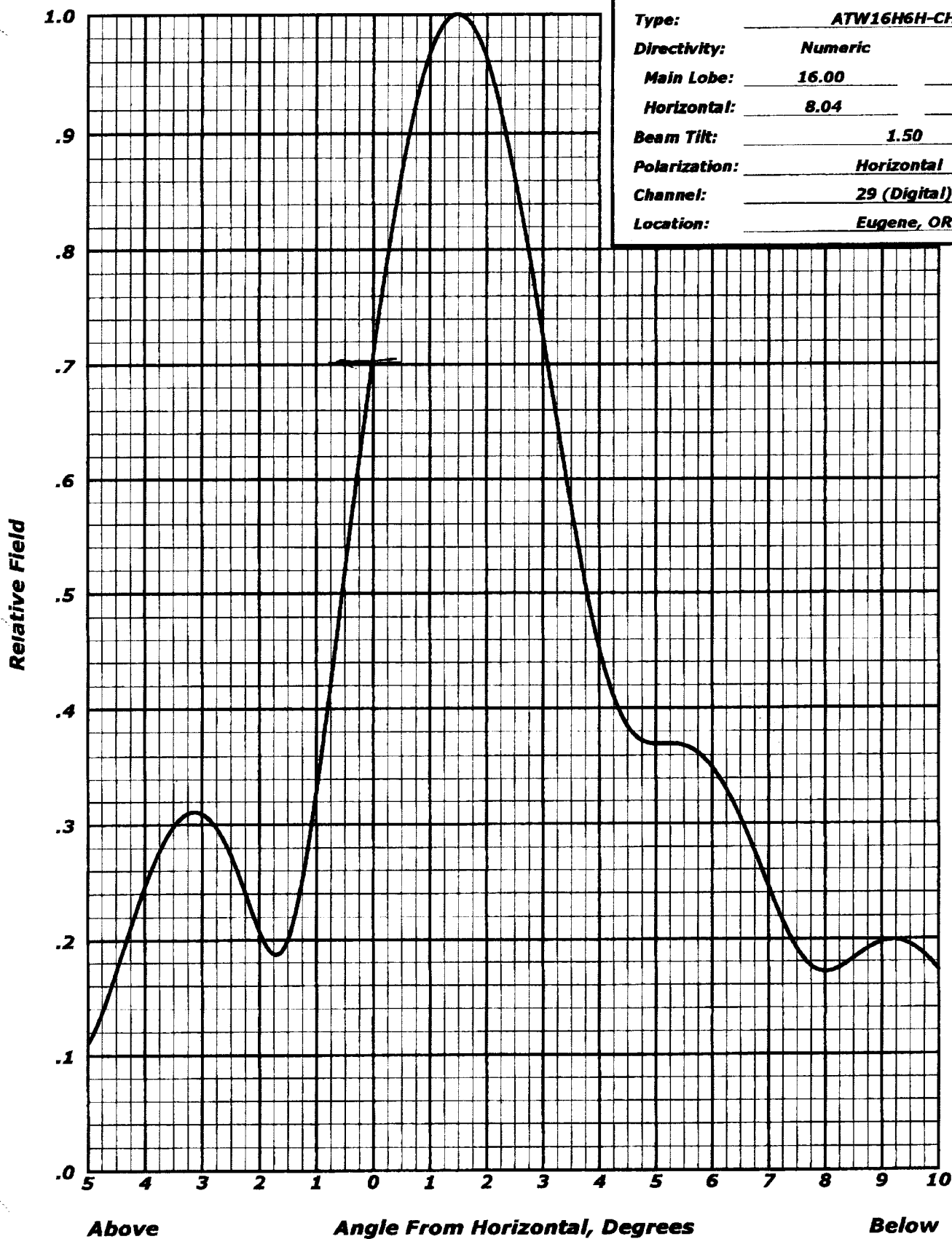
Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
0	0.991	-0.08	110	0.489	-6.21	220	0.242	-12.32	330	0.997	-0.03
2	0.992	-0.07	112	0.474	-6.48	222	0.255	-11.87	332	0.998	-0.02
4	0.993	-0.06	114	0.459	-6.76	224	0.273	-11.28	334	0.999	-0.01
6	0.994	-0.05	116	0.445	-7.03	226	0.291	-10.72	336	1.000	0.00
8	0.994	-0.05	118	0.429	-7.35	228	0.309	-10.20	338	1.000	0.00
10	0.995	-0.04	120	0.414	-7.66	230	0.326	-9.74	340	0.999	-0.01
12	0.995	-0.04	122	0.396	-8.05	232	0.345	-9.24	342	0.998	-0.02
14	0.996	-0.03	124	0.380	-8.40	234	0.363	-8.80	344	0.998	-0.02
16	0.998	-0.02	126	0.363	-8.80	236	0.380	-8.40	346	0.996	-0.03
18	0.998	-0.02	128	0.345	-9.24	238	0.396	-8.05	348	0.995	-0.04
20	0.999	-0.01	130	0.326	-9.74	240	0.414	-7.66	350	0.995	-0.04
22	1.000	0.00	132	0.309	-10.20	242	0.429	-7.35	352	0.994	-0.05
24	1.000	0.00	134	0.291	-10.72	244	0.445	-7.03	354	0.994	-0.05
26	0.999	-0.01	136	0.273	-11.28	246	0.459	-6.76	356	0.993	-0.06
28	0.998	-0.02	138	0.255	-11.87	248	0.474	-6.48	358	0.992	-0.07
30	0.997	-0.03	140	0.242	-12.32	250	0.489	-6.21	360	0.991	-0.08
32	0.994	-0.05	142	0.223	-13.03	252	0.502	-5.99			
34	0.992	-0.07	144	0.209	-13.60	254	0.517	-5.73			
36	0.988	-0.10	146	0.197	-14.11	256	0.529	-5.53			
38	0.983	-0.15	148	0.186	-14.61	258	0.545	-5.27			
40	0.978	-0.19	150	0.177	-15.04	260	0.559	-5.05			
42	0.970	-0.26	152	0.170	-15.39	262	0.575	-4.81			
44	0.962	-0.34	154	0.167	-15.55	264	0.589	-4.60			
46	0.956	-0.39	156	0.164	-15.70	266	0.604	-4.38			
48	0.946	-0.48	158	0.164	-15.70	268	0.618	-4.18			
50	0.936	-0.57	160	0.166	-15.60	270	0.634	-3.96			
52	0.926	-0.67	162	0.169	-15.44	272	0.649	-3.76			
54	0.914	-0.78	164	0.173	-15.24	274	0.665	-3.54			
56	0.902	-0.90	166	0.177	-15.04	276	0.681	-3.34			
58	0.887	-1.04	168	0.182	-14.80	278	0.697	-3.14			
60	0.874	-1.17	170	0.188	-14.52	280	0.713	-2.94			
62	0.858	-1.33	172	0.192	-14.33	282	0.729	-2.75			
64	0.842	-1.49	174	0.195	-14.20	284	0.745	-2.56			
66	0.826	-1.66	176	0.198	-14.07	286	0.762	-2.36			
68	0.813	-1.80	178	0.199	-14.02	288	0.778	-2.18			
70	0.795	-1.99	180	0.200	-13.98	290	0.795	-1.99			
72	0.778	-2.18	182	0.199	-14.02	292	0.813	-1.80			
74	0.762	-2.36	184	0.198	-14.07	294	0.826	-1.66			
76	0.745	-2.56	186	0.195	-14.20	296	0.842	-1.49			
78	0.729	-2.75	188	0.192	-14.33	298	0.858	-1.33			
80	0.713	-2.94	190	0.188	-14.52	300	0.874	-1.17			
82	0.697	-3.14	192	0.182	-14.80	302	0.887	-1.04			
84	0.681	-3.34	194	0.177	-15.04	304	0.902	-0.90			
86	0.665	-3.54	196	0.173	-15.24	306	0.914	-0.78			
88	0.649	-3.76	198	0.169	-15.44	308	0.926	-0.67			
90	0.634	-3.96	200	0.166	-15.60	310	0.936	-0.57			
92	0.618	-4.18	202	0.164	-15.70	312	0.946	-0.48			
94	0.604	-4.38	204	0.164	-15.70	314	0.956	-0.39			
96	0.589	-4.60	206	0.167	-15.55	316	0.962	-0.34			
98	0.575	-4.81	208	0.170	-15.39	318	0.970	-0.26			
100	0.559	-5.05	210	0.177	-15.04	320	0.978	-0.19			
102	0.545	-5.27	212	0.186	-14.61	322	0.983	-0.15			
104	0.529	-5.53	214	0.197	-14.11	324	0.988	-0.10			
106	0.517	-5.73	216	0.209	-13.60	326	0.992	-0.07			
108	0.502	-5.99	218	0.223	-13.03	328	0.994	-0.05			



ANDREW

ELEVATION PATTERN

Type:	ATW16H6H-CH29	
Directivity:	Numeric	dBd
Main Lobe:	16.00	(12.04)
Horizontal:	8.04	(9.05)
Beam Tilt:	1.50	
Polarization:	Horizontal	
Channel:	29 (Digital)	
Location:	Eugene, OR	





TABULATED DATA FOR ELEVATION PATTERN

TYPE : ATW16H6H-CH29

Angle	Field	dB	Angle	Field	dB	Angle	Field	dB	Angle	Field	dB
-5 To 10			10 To 90								
In 0.25 Increments			In 0.5 Increments								
-5.00	0.110	-19.16	8.75	0.192	-14.35	35.00	0.055	-25.12	62.50	0.025	-31.96
-4.75	0.137	-17.29	9.00	0.198	-14.09	35.50	0.048	-26.41	63.00	0.031	-30.08
-4.50	0.172	-15.27	9.25	0.199	-14.02	36.00	0.038	-28.35	63.50	0.038	-28.30
-4.25	0.211	-13.53	9.50	0.195	-14.18	36.50	0.033	-29.76	64.00	0.045	-26.92
-4.00	0.247	-12.16	9.75	0.186	-14.59	37.00	0.036	-28.99	64.50	0.051	-25.93
-3.75	0.277	-11.15	10.00	0.173	-15.24	37.50	0.044	-27.15	65.00	0.054	-25.30
-3.50	0.299	-10.50	10.50	0.139	-17.14	38.00	0.052	-25.74	65.50	0.056	-24.99
-3.25	0.310	-10.17	11.00	0.111	-19.07	38.50	0.055	-25.14	66.00	0.056	-24.98
-3.00	0.310	-10.19	11.50	0.109	-19.27	39.00	0.054	-25.36	66.50	0.055	-25.24
-2.75	0.297	-10.55	12.00	0.124	-18.11	39.50	0.048	-26.40	67.00	0.051	-25.79
-2.50	0.273	-11.28	12.50	0.137	-17.29	40.00	0.039	-28.17	67.50	0.047	-26.64
-2.25	0.241	-12.37	13.00	0.135	-17.42	40.50	0.032	-30.02	68.00	0.041	-27.81
-2.00	0.207	-13.67	13.50	0.118	-18.59	41.00	0.031	-30.23	68.50	0.034	-29.36
-1.75	0.188	-14.54	14.00	0.093	-20.59	41.50	0.037	-28.58	69.00	0.027	-31.32
-1.50	0.201	-13.94	14.50	0.077	-22.22	42.00	0.046	-26.84	69.50	0.021	-33.61
-1.25	0.252	-11.96	15.00	0.082	-21.73	42.50	0.052	-25.74	70.00	0.017	-35.61
-1.00	0.330	-9.62	15.50	0.097	-20.27	43.00	0.054	-25.40	70.50	0.016	-35.79
-0.75	0.422	-7.49	16.00	0.106	-19.46	43.50	0.051	-25.81	71.00	0.020	-34.07
-0.50	0.519	-5.69	16.50	0.104	-19.66	44.00	0.045	-26.93	71.50	0.025	-31.96
-0.25	0.617	-4.20	17.00	0.090	-20.91	44.50	0.037	-28.67	72.00	0.031	-30.15
0.00	0.709	-2.98	17.50	0.071	-22.92	45.00	0.030	-30.37	72.50	0.037	-28.72
0.25	0.794	-2.01	18.00	0.061	-24.27	45.50	0.030	-30.50	73.00	0.042	-27.62
0.50	0.866	-1.25	18.50	0.067	-23.43	46.00	0.036	-28.95	73.50	0.046	-26.78
0.75	0.925	-0.68	19.00	0.080	-21.91	46.50	0.044	-27.22	74.00	0.049	-26.17
1.00	0.968	-0.29	19.50	0.088	-21.12	47.00	0.050	-26.05	74.50	0.052	-25.74
1.25	0.993	-0.06	20.00	0.085	-21.36	47.50	0.053	-25.53	75.00	0.053	-25.47
1.50	1.000	0.00	20.50	0.074	-22.64	48.00	0.052	-25.66	75.50	0.054	-25.34
1.75	0.989	-0.09	21.00	0.059	-24.64	48.50	0.048	-26.44	76.00	0.054	-25.33
2.00	0.962	-0.34	21.50	0.051	-25.90	49.00	0.040	-27.86	76.50	0.053	-25.43
2.25	0.919	-0.73	22.00	0.057	-24.92	49.50	0.033	-29.76	77.00	0.052	-25.64
2.50	0.863	-1.28	22.50	0.068	-23.29	50.00	0.027	-31.27	77.50	0.050	-25.94
2.75	0.797	-1.97	23.00	0.076	-22.40	50.50	0.028	-30.93	78.00	0.048	-26.34
3.00	0.724	-2.80	23.50	0.075	-22.52	51.00	0.035	-29.17	78.50	0.046	-26.81
3.25	0.649	-3.76	24.00	0.066	-23.67	51.50	0.042	-27.44	79.00	0.043	-27.37
3.50	0.575	-4.81	24.50	0.052	-25.63	52.00	0.049	-26.23	79.50	0.040	-28.01
3.75	0.508	-5.89	25.00	0.044	-27.20	52.50	0.052	-25.60	80.00	0.037	-28.72
4.00	0.451	-6.91	25.50	0.047	-26.51	53.00	0.053	-25.54	80.50	0.033	-29.51
4.25	0.410	-7.74	26.00	0.058	-24.76	53.50	0.050	-26.02	81.00	0.030	-30.37
4.50	0.384	-8.30	26.50	0.066	-23.61	54.00	0.044	-27.06	81.50	0.027	-31.30
4.75	0.372	-8.58	27.00	0.067	-23.43	54.50	0.037	-28.63	82.00	0.024	-32.30
5.00	0.369	-8.65	27.50	0.061	-24.25	55.00	0.030	-30.53	82.50	0.021	-33.38
5.25	0.370	-8.65	28.00	0.050	-25.97	55.50	0.026	-31.85	83.00	0.019	-34.53
5.50	0.368	-8.68	28.50	0.040	-27.87	56.00	0.027	-31.33	83.50	0.016	-35.75
5.75	0.362	-8.82	29.00	0.040	-28.00	56.50	0.033	-29.56	84.00	0.014	-37.04
6.00	0.350	-9.13	29.50	0.048	-26.33	57.00	0.041	-27.81	84.50	0.012	-38.41
6.25	0.330	-9.62	30.00	0.058	-24.79	57.50	0.047	-26.49	85.00	0.010	-39.85
6.50	0.305	-10.31	30.50	0.062	-24.13	58.00	0.052	-25.67	85.50	0.009	-41.38
6.75	0.276	-11.18	31.00	0.060	-24.41	58.50	0.054	-25.31	86.00	0.007	-42.99
7.00	0.245	-12.22	31.50	0.052	-25.62	59.00	0.054	-25.38	86.50	0.006	-44.71
7.25	0.216	-13.33	32.00	0.042	-27.54	59.50	0.051	-25.88	87.00	0.005	-46.56
7.50	0.192	-14.35	32.50	0.035	-29.00	60.00	0.046	-26.82	87.50	0.004	-48.60
7.75	0.176	-15.07	33.00	0.039	-28.28	60.50	0.039	-28.22	88.00	0.003	-50.93
8.00	0.171	-15.32	33.50	0.047	-26.47	61.00	0.031	-30.04	88.50	0.002	-53.73
8.25	0.175	-15.14	34.00	0.055	-25.15	61.50	0.025	-31.97	89.00	0.001	-57.48
8.50	0.183	-14.75	34.50	0.058	-24.69	62.00	0.023	-32.92	89.50	0.001	-60.00

Exhibit 11
KEPB-DT Ch. 29 Eugene, Oregon
Allocation Study

DTV-into-DTV and DTV-into-NTSC

A detailed interference study has been conducted to demonstrate that the proposed operation of KEPB-DT will not cause in excess of 2% additional interference to digital or NTSC television stations or allotments contained in Appendix B of the Second Memorandum Opinion and Order on Reconsideration of the Fifth and Sixth Report and Orders in MM Docket 87-268 Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service.

The time-shared "HDTV" computer program offered by the National Telecommunications and Information Administration's *TA Services* in Boulder, Colorado was employed as the method for coverage and interference protection. The HDTV computer program has been developed in close coordination with the Commission's OET staff, and utilizes similar methodology as the computer program used by the Commission to develop the DTV Table of Allotments. Predictions included "clipping" the extent of protected coverage as specified under §73.623(c)(2) at the Grade B contour distance for analog stations per §73.684 and at the DTV coverage contour distance for DTV assignments per §73.625(b). It is believed that the HDTV program offered by *TA Services* is compliant with the FCC's Office of Engineering and Technology Bulletin 69 Longley-Rice Methodology for Evaluating TV Coverage and Interference ("OET-69"), July 2, 1997.

A baseline study was made to determine the population which is impacted by interference from the KEPB-DT allotment facility. The results of this study are as follows:

Stations that are actually interfered with.

Name	NTSC Int	HDTV Int	Population(1990)
KEPB2003	0.00 sq km	65.40 sq km	255.
DKPTV-DT	0.00 sq km	192.47 sq km	29806.

A second study was made to determine the population which would be impacted by interference from the proposed KEPB-DT facility. The results of this study are as follows:

Stations that are actually interfered with.

Name	NTSC Int	HDTV Int	Population(1990)	Additional
KEPB2003	0.00 sq km	92.80 sq km	454.	+199
DKPTV-DT	0.00 sq km	329.79 sq km	46527.	+16721

The results indicate that the proposed KEPB-DT facility is predicted to cause additional interference to the paired analog operation of KEPB-TV (as proposed in a concurrently-filed application), and to KPTV-DT. The additional interference caused to KEPB-TV is less than 0.1% of the population served by that facility. The additional interference caused to KPTV-DT is less than 1% of the population served by that facility. Therefore, this proposal is believed to comply with all Commission allocation requirements with respect to protection of NTSC and DTV stations and allotments.

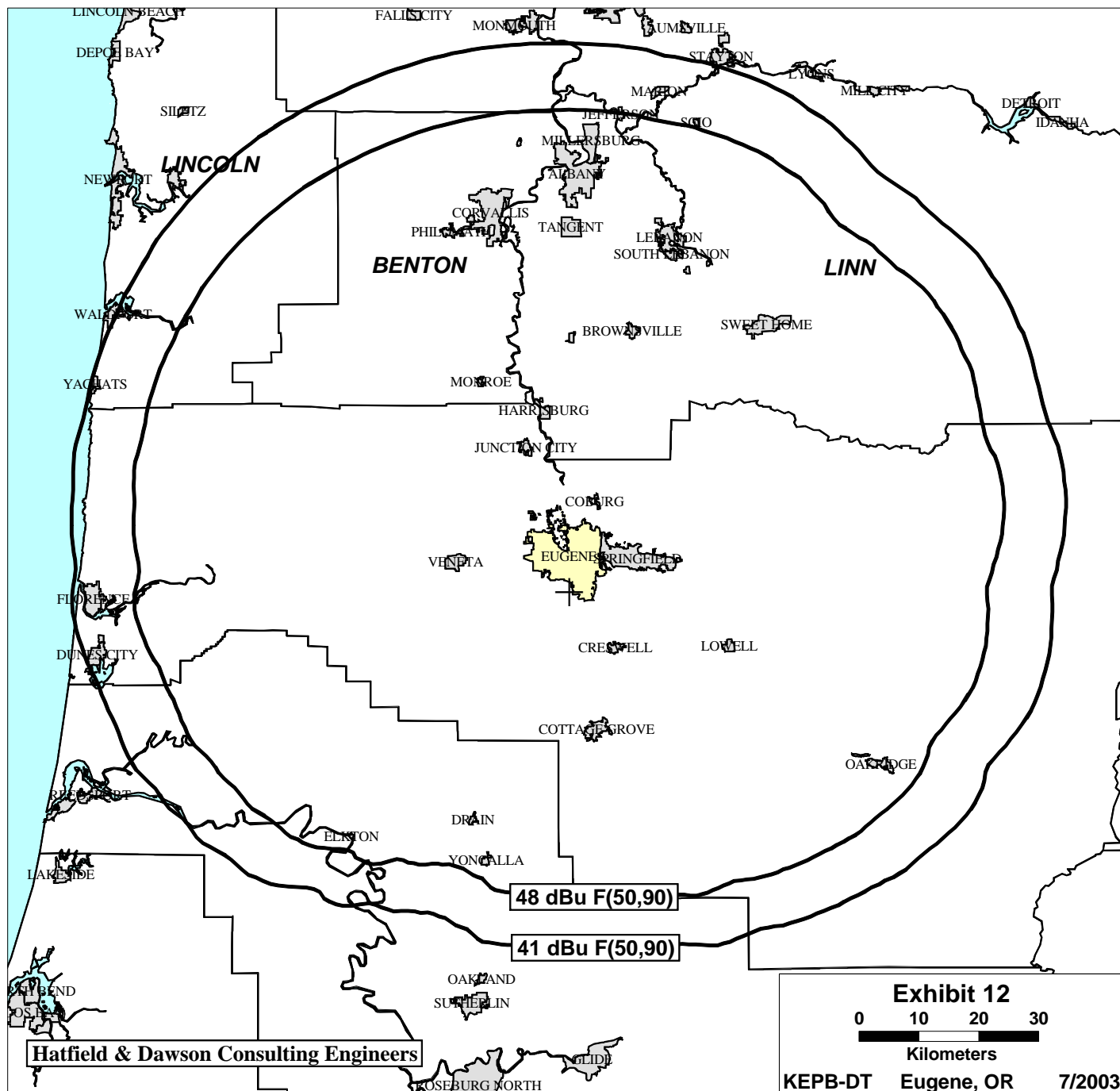


Exhibit 13
KEPB-DT Ch. 29 Eugene, Oregon
NIER Study

Facility Description

The proposed operation will be on UHF Channel 29 (560-566 MHz) with a maximum lobe effective radiated power of 100 kilowatts at 1.5 degrees of electrical beam tilt. Maximum power at the radio horizon will be 75 kW (18.75 dBk). Operation is proposed with a horizontally polarized Andrew ATW16H8-HSC3L-28H antenna, mounted on an existing tower at Blanton Heights in Eugene. The FCC Antenna Structure Registration Number for this tower is #1033594.

NIER Calculations

OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (Edition 97-01) states in part that:

When performing an evaluation for compliance with the FCC's RF guidelines all significant contributors to the ambient RF environment should be considered. . .For purposes of such consideration, significance can be taken to mean any transmitter producing more than 5% of the applicable exposure limit (in terms of power density or the square of the electric or magnetic field strength) at accessible locations.

As will be demonstrated below, the proposed KEPB-DT operation will produce less than 5% of the applicable exposure limit for both controlled and uncontrolled environments. Thus, the proposed facility is categorically excluded from the requirement of further study. Therefore, pursuant to §1.1307(b)(3) of the Commission's Rules no calculations are required for the other FM and TV facilities in the vicinity, and precise calculations are made only with regard to the levels from this proposal.

The power density calculations shown below were made using the techniques and formulas outlined in the OET Bulletin 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower.

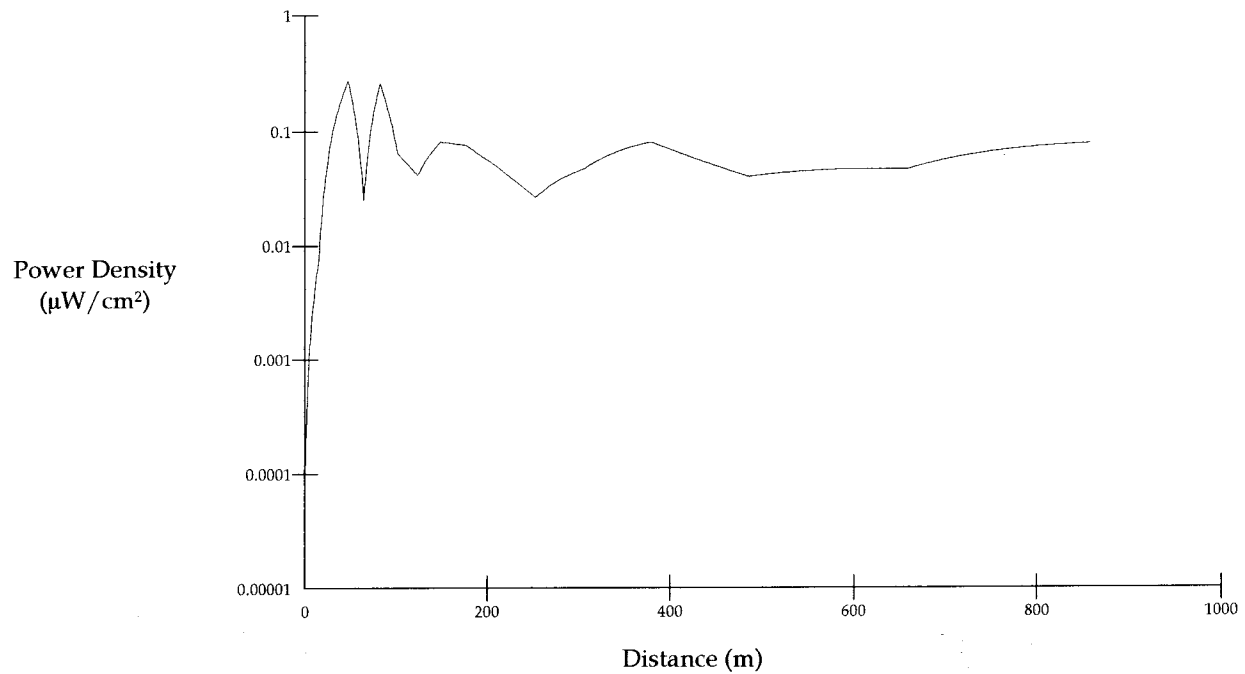
Power density levels produced by the proposed KEPB-DT antenna were calculated using the attached vertical pattern for the Andrew ATW16H8-HSC3L-28H antenna proposed in this application. The worst-case power density occurs at a distance of 55 meters from the base of the antenna support structure. At this point the power density is calculated to be 0.3 FW/cm^2 , which is less than 0.1% of 1871 FW/cm^2 (the FCC standard for controlled environments at the Ch. 29 frequency) and less than 0.1% of 374 FW/cm^2 (the FCC standard for uncontrolled environments at the Ch. 29 frequency).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed KEPB-DT operation alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 1000 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 et seq and no further analysis of non-ionizing radiation at this site is required in this application.

Public access to the site is restricted and the antenna tower is posted with warning signs. Pursuant to OST 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 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.

Power Density vs Distance



Ground-Level NIER Analysis

KEPB-DT Eugene, Oregon

Antenna Type: Andrew ATW16H8-HSC3L-28H

Distance: 1000 meters

Horizontal ERP: 100 kW (average)

Antenna Height: 208 meters AGL

Maximum Power Density is $0.3 \mu\text{W}/\text{cm}^2$ at 55 meters from the antenna structure.

Hatfield & Dawson Consulting Engineers