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**Engineering Statement
Digital Replacement Translator Modification Application for KBTC-TV
Channel 16 at Seattle, WA
July 2013**

This Engineering Statement has been prepared on behalf of Bates Technical College ("Bates"), licensee of television station KBTC-TV at Tacoma, Washington. This material has been prepared in connection with an application for modification of the digital replacement translator which ensures service to KBTC-TV viewers in the vicinity of Seattle, Washington. Due to failure of the installed antenna, Bates intends to replace the antenna with a similar model from another manufacturer.

I. Allocation Study

Study has been made of all cochannel and adjacent-channel facilities in the vicinity of the proposed operation, including a detailed Longley-Rice interference study to demonstrate that the proposed operation will not cause interference to any facilities with which contour overlap exists. This study was performed using the SunDTV program from V-Soft Communications and a 1 km grid spacing. The SunDTV program identically duplicates the FCC's OET-69 processing program.

The results of this study indicate that the proposed facility is predicted to cause zero additional interference to any of the listed stations.

Summary Study

Percent allowed new interference: 0.500
Percent allowed new interference to non Class A LPTV: 2.000
Census data selected 2000
Data Base Selected
./data_files/pt_tvdb.sff

WARNING WARNING WARNING

The following list of station records has been excluded from the analysis due to the fact that they have the same state, city and channel as the proposed station - This could cause the program to not find a potential fail situation

You can force the program to include these records by setting the state of the proposed record to ZZ and re-running the analysis

KBTC-TV 16 SEATTLE WA BLEDT 20120621AAY

TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 07-08-2013 Time: 13:20:45

Record Selected for Analysis

KBTC-TV USERRECORD-01 SEATTLE WA US
Channel 16 ERP 1. kW HAAT 189. m RCAMSL 00225 m STRINGENT MASK
Latitude 047-36-57 Longitude 0122-18-26
Status APP Zone 2 Border Site number: 01
Dir Antenna Make usr Model USRPAT01 Beam tilt N Ref Azimuth 180.
Last update Cutoff date Docket
Comments
Applicant

Cell Size for Service Analysis 1.0 km/side

Distance Increments for Longley-Rice Analysis 1.00 km

Not full service station
Service Class = LD
Maximum height/power limits not checked

Site number	1			
Azimuth	ERP	HAAT	51.0 dBu F(50,90)	
(Deg)	(kW)	(m)	(km)	
0.0	0.503	152.6	29.5	
45.0	0.428	201.2	31.4	
90.0	0.482	180.4	30.9	
135.0	0.805	181.4	33.6	
180.0	1.000	154.9	33.1	
225.0	0.805	207.4	35.1	
270.0	0.482	222.2	33.2	
315.0	0.428	214.7	32.2	

Contour Overlap to Proposed Station

Contour Overlap Evaluation to Proposed Station Complete

NO LANDMOBILE SPACING VIOLATIONS FOUND

Checks to Site Number 01

Proposed facility OK to FCC Monitoring Stations

Proposed facility OK toward West Virginia quiet zone

Proposed facility OK toward Table Mountain

Proposed facility is within the Canadian coordination distance
Distance to border = 101.6km

Proposed facility is beyond the Mexican coordination distance

Proposed station is OK toward AM broadcast stations

Start of Interference Analysis

Channel	Proposed Station Call	City/State	ARN
16	KBTC-TV	SEATTLE WA	USERRECORD01

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
15	K15IQ-D	ASTORIA OR	195.3	CP	BNPDTL	-20100324ACA
15	K15IX-D	RAINIER OR	166.7	LIC	BLDTT	-20130103ACW
15	K15KC-D	YAKIMA WA	181.7	CP	BNPDTL	-20100422ADC
16	K16KI-D	BEND OR	400.8	CP	BNPDTL	-20100716ACW
16	DKMOR-LP	EUGENE OR	392.7	CP	BDISDTL	-20100209ABA
16	K16JS-D	EUGENE OR	406.5	CP	BNPDTL	-20091221AIJ
16	KOAB-TV	MADRAS OR	349.1	LIC	BLEDT	-20120427AAO
16	KORS-CD	PORTLAND OR	213.9	APP	BSTA	-20130215ABV
16	KORS-CD	PORTLAND OR	235.1	LIC	BLDTA	-20100517ABN
16	K16EM-D	PRINEVILLE, ETC. OR	368.6	LIC	BLDTT	-20091124AHA
16	KORS-CD	SALEM OR	235.1	CP	BPTTA	-20040902AAJ
16	K16HP-D	EAST WENATCHEE WA	158.7	LIC	BLDTT	-20101124AHH
16	KORX-CA	WALLA WALLA WA	363.3	LIC	BLTTA	-20050202ADO
16	KNDO	YAKIMA WA	181.8	LIC	BLCDT	-20090217ACI
17	K17HA-D	ASTORIA OR	190.7	CP	BPDTT	-20121012ACV
17	K17HA-D	ASTORIA OR	190.7	LIC	BLDTT	-20120713ADN
17	K17GV	RAINIER OR	166.7	LIC	BLTT	-20070209ABT
17	K17GV	RAINIER OR	166.7	CP	BDFCDTT	-20090821ACQ
17	K17IL-D	ELLENSBURG, ETC. WA	162.4	LIC	BLDTT	-20090506ACN
17	K17IZ-D	EVERETT WA	48.2	LIC	BLDTL	-20101201AEX
17	K17KR-D	WINTHROP WA	180.2	LIC	BLDTT	-20120614ABY
17	K17KI-D	YAKIMA WA	157.7	CP	BNPDTL	-20100422ADD

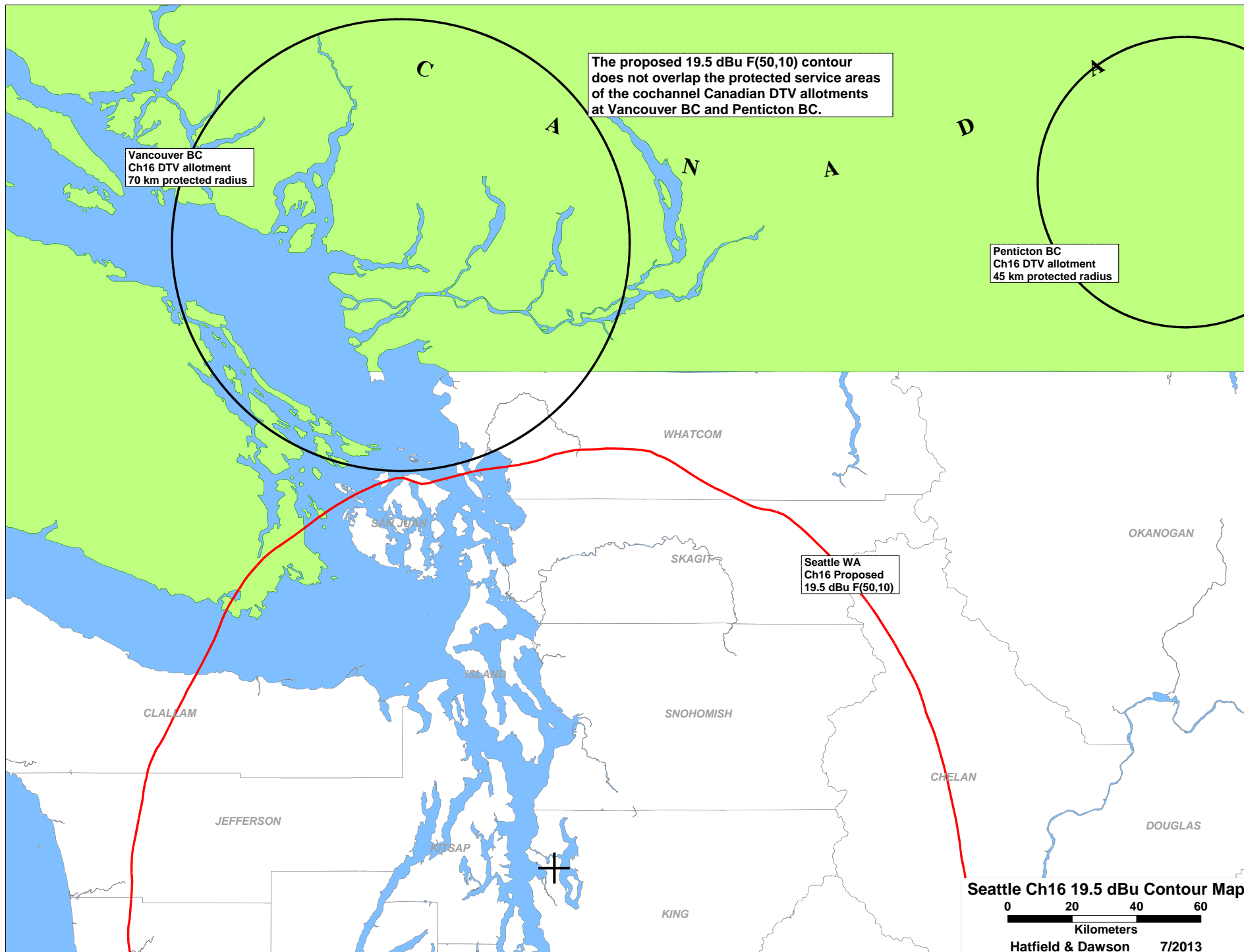
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Study of this proposal found the following interference problem(s):

NONE.

Canada

There are two cochannel (Ch 16) Canadian digital television allotments in the vicinity of the proposed operation, at Vancouver BC and Penticton BC. Vancouver is a Canadian “Class C” allotment, which is protected out to a radius of 70 km. Penticton is a Canadian “Class B” allotment, which is protected out to a radius of 45 km. As is demonstrated by the attached map exhibit, the 19.5 dBu F(50,10) contour from the proposed facility does not overlap the protected service area of either of these Canadian digital Ch 16 allotments.



II. RF Exposure Study

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 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 outlined in OET Bulletin No. 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. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

D is the distance in meters from the center of radiation to the calculation point.

Power density levels produced by the proposed facility were calculated using the manufacturer's vertical plane pattern for the horizontally-polarized ERI AL8-16-OC antenna proposed in this application. The highest calculated power density from the proposed antenna alone occurs 54 meters from the base of the antenna support structure. At this point the power density is calculated to be 0.24 $\mu W/cm^2$, which is 0.1% of 323 $\mu W/cm^2$ (the FCC maximum for uncontrolled environments at the Channel 16 frequency).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed 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 RF exposure at this site is required in this application.

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 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 exposure in excess of FCC guidelines.

July 8, 2013

Erik C. Swanson, P.E.