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**Engineering Statement  
Minor Change of KBTC-TV Digital Replacement Translator  
Channel 28 at Seattle, WA  
March 2020**

This Engineering Statement has been prepared on behalf of Bates Technical College ("Bates"), licensee of a digital replacement translator station for KBTC-TV at Seattle, Washington. This material has been prepared in connection with an application for a minor change.

**I. Interference 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 authorized or pending proposed facilities. This study was performed using the Commission's TVStudy software.

The results of this study indicate that the proposed facility is predicted to cause zero additional interference to any of the listed stations, with the exception of interference predicted to the KBTC-TV licensed (BLEDT-20130805ACW) and application (0000035735) facilities. Bates, being the licensee of both KBTC-TV and the KBTC-TV digital replacement translator, expressly consents to these interference levels between its stations.

Based on the foregoing interference study, it is believed that the proposed facility can operate without risk of objectionable interference to other stations.

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Study created: 2020.03.26 13:54:50

Study build station data: LMS TV 2020-03-26

Proposal: KBTC-TV D28 LD APP TACOMA, WA  
File number: KBTC-DRT5\_5KW  
Facility ID: 62469  
Station data: User record  
Record ID: 954  
Country: U.S.

Build options:  
Protect pre-transition records not on baseline channel

Search options:  
Non-U.S. records included

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K39DM	D27+	LD	CP	ELLENSBURG, WA	BLANK0000028952	162.4 km
No	K27NZ-D	D27	LD	LIC	LONGVIEW, WA	BLANK0000068892	166.7
Yes	KBTC-TV	D27	DT	APP	TACOMA, WA	BLANK0000035735	40.5
Yes	KBTC-TV	D27	DT	LIC	TACOMA, WA	BLEDT20130805ACW	40.5
No	K28FP-D	D28	LD	LIC	ASTORIA, OR	BLANK0000073365	190.8
No	K28MH-D	D28	LD	CP	BEND, OR	BLANK0000068954	393.6
No	K28GD-D	D28	LD	LIC	HEPPNER, ETC., OR	BLDIT20111117ARH	353.0
No	K28CQ-D	D28	LD	LIC	HOOD RIVER, OR	BLDIT20120514ACX	215.6
No	K28OV-D	D28	LD	LIC	Madras, OR	BLANK0000063058	349.0
No	K28FT-D	D28	LD	LIC	MILTON-FREEWATER, OR	BLDIT20111206BCR	366.5
No	KOPB-TV	D28	LD	LIC	PORTLAND, OR	BLANK0000068708	238.1
No	K28IH-D	D28	LD	LIC	RAINIER, OR	BLDIT20091103AAJ	166.7
No	K28MJ-D	D28	LD	LIC	TILLAMOOK, OR	BLDIT20111209DLD	289.0
No	K28KJ-D	D28	LD	LIC	CHELAN, WA	BLDIT20111012ABP	171.4
No	K28KJ-D	D28	LD	CP	CHELAN, WA	BMPDIT20101012ABD	171.4
No	K42IH-D	D28	LD	CP	EAST WENATCHEE, ECT, WA	BLANK0000054491	158.8
No	K28QG-D	D28	LD	CP	ELLENSBURG, WA	BNPDL20090825AEW	151.6
No	K28QK-D	D28	LD	CP	PASCO, WA	BLANK0000071911	300.0
No	KAYU-TV	D28	DT	LIC	SPOKANE, WA	BLCDT20091029ACN	375.6
No	K28KW-D	D28	LD	LIC	SUNNYSIDE, WA	BLDIT20130719ABV	223.8
No	NEW	D28	LD	APP	YAKIMA, WA	BNPDL20090825AMW	181.5
No	K29IA-D	D29	LD	LIC	CENTRALIA, ETC., WA	BLDIT20090618ABC	130.9
No	NEW	D29	LD	APP	ELLENBURG, WA	BNPDL20090825AKK	169.5
No	NEW	D29	LD	APP	ELLENSBURG, WA	BNPDL20090825AEN	151.6
Yes	K29ED-D	D29	LD	LIC	EVERETT, WA	BLDIT20110812ACJ	42.5
No	K29IB-D	D29	LD	LIC	GRAYS RIVER, ETC., WA	BLDIT20100511ACN	159.1
No	KCYU-LD	D29	LD	LIC	YAKIMA, WA	BLANK0000072828	181.6
No	CKVU-DT-2	D27	DT	LIC	VICTORIA, BC	BLANKCANADA103	118.1
Yes	CHAN-DT-2	D28	DT	LIC	BOWEN ISLAND, BC	BLANKCANADA46	212.4
No	CH2126	D28	DC	LIC	PEMBERTON, BC	BLANKCANLP268	302.9
Yes	CIVI-DT	D28	DT	LIC	VICTORIA, BC	BLANKCANADA102	118.1
No	CHNM-DT-1	D29	DT	LIC	VICTORIA, BC	BLANKCANADA104	118.1

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D28  
Mask: Stringent  
Latitude: 47 36 56.30 N (NAD83)  
Longitude: 122 18 30.40 W  
Height AMSL: 270.0 m  
HAAT: 0.0 m  
Peak ERP: 5.50 kW  
Antenna: ERI-AL8-28-OC (ID 1004777) 180.0 deg  
Elev Pattn: Generic  
Elec Tilt: 1.75

50.1 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	2.76 kW	183.6 m	41.1 km
45.0	2.35	239.4	43.5
90.0	2.65	218.3	42.9

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135.0	4.43	224.9	46.0
180.0	5.50	206.1	46.0
225.0	4.43	251.5	47.4
270.0	2.65	266.9	45.5
315.0	2.35	255.9	44.3

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m    Computed HAAT: 231 m

\*\*Proposal 25.14 dBu contour crosses Canadian border, coordination required  
Distance to Canadian border: 102.1 km

Distance to Mexican border: 1719.3 km

Conditions at FCC monitoring station: Ferndale WA  
Bearing: 353.1 degrees    Distance: 150.1 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 115.1 degrees    Distance: 1593.2 km

Study cell size: 1.00 km  
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%  
Maximum new IX to LPTV: 2.00%

\*\*MX with BLANK0000035735 APP scenario 1, 7.24% interference caused  
\*\*IX check failure to BLEDT20130805ACW LIC scenario 1, 15.11% interference caused

---- Below is IX received by proposal KBTCDRT5\_5KW ----

\*\*MX with BLANK0000035735 APP scenario 1, 3.55% interference received  
Proposal receives 3.27% interference from scenario 2

The interference indicated in the last line of the study is received by the proposed DRT facility, and is received from Bates' own application for minor modification of KBTC-TV. Bates consents to this interference level.

## II. RF Exposure Study

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 for an elevation of 2 meters above ground (143 meters below the antenna radiation center). The worst case power density levels occur at depression angles between 45 and 90 degrees below the horizontal. The calculations in this report assume a worst-case relative field value of 0.103 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized ERI AL8OC-28-H antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 58.3 watts at depression angles between 45 and 90 degrees below the horizontal. Assuming this power and the shortest distance between the antenna radiation center and 2 meters above ground level (i.e. straight down), the highest calculated power density from the proposed antenna alone occurs at the base of the antenna support structure. At this point the power density from the proposed facility is calculated to be 0.1  $\mu W/cm^2$ , which is <0.1% of 369.3  $\mu W/cm^2$  (the FCC maximum for uncontrolled environments at the Channel 28 frequency).

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.

March 27, 2020

Erik C. Swanson, P.E.