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**Engineering Statement  
Minor Modification Application for K53AZ (K29IA-D)  
Channel 29 at Centralia, WA  
May 2009**

This Engineering Statement has been prepared on behalf of KIRO-TV, Inc., licensee of TV translator station K53AZ at Centralia, Washington. This material has been prepared in connection with an application for minor modification of the digital displacement permit for this translator as K29IA-D.

**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.

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

Summary Study

1990 Census data selected  
TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 05-07-2009 Time: 22:50:34

Record Selected for Analysis

K53AZ USERRECORD-01 CENTRALIA, ETC. WA US  
Channel 29 ERP 1.2 kW HAAT 300. m RCAMSL 00453 m STRINGENT MASK  
Latitude 046-33-18 Longitude 0123-03-25  
Status APP Zone 2 Border  
Dir Antenna Make usr Model USRPAT01 Beam tilt N Ref Azimuth 70.  
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

Facility meets maximum power limit

Azimuth (Deg)	ERP (kW)	HAAT (m)	51.0 dBu F(50,90) (km)
0.0	0.654	316.6	39.1
45.0	0.702	357.3	41.3
90.0	0.617	296.1	37.9
135.0	0.836	299.0	39.7
180.0	0.049	300.7	24.6
225.0	0.008	221.7	13.3
270.0	0.003	290.0	11.9
315.0	0.033	321.4	23.2

Contour Overlap to Proposed Station

Station  
K63AW 29 GRAYS RIVER WA BDISTT20061212ABF causes

Contour overlap to Digital LPTV station  
K53AZ 29 CENTRALIA, ETC. WA USERRECORD01  
Required D/U ratio: 2.0

Contour Overlap Evaluation to Proposed Station Complete

LANDMOBILE SPACING VIOLATIONS FOUND

NONE

Proposed facility OK to FCC Monitoring Stations

Proposed facility OK toward West Virginia quite zone

Proposed facility OK toward Table Mountain

Proposed facility is within the Canadian coordination distance  
Distance to border = 188.7km

Proposed facility is beyond the Mexican coordination distance

Proposed station is OK toward AM broadcast stations

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Start of Interference Analysis

Channel	Proposed Station Call	City/State	ARN
29	K53AZ	CENTRALIA, ETC. WA	USERRECORD01

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
14	K14HN	VANCOUVER, CAMAS WA	109.9	LIC	BLTTL	-19940506IP
15	KCKA	CENTRALIA WA	0.1	LIC	BLET	-19821004KG
21	K21HG	RAINIER OR	46.4	LIC	BLTT	-20070209ABR
21	K21DE	SEASIDE-ASTORIA OR	71.0	LIC	BLTTL	-19940902IE
22	KMYQ	SEATTLE WA	130.9	LIC	BLCT	-19990708KE
25	K25CG	ABERDEEN WA	66.4	LIC	BLTT	-19890801IB
25	K25CH	CENTRALIA WA	0.1	LIC	BLTT	-20031124AHA
26	K26DB	ASTORIA OR	71.0	LIC	BLTT	-19911016IG
26	K26GJ	PORTLAND OR	128.4	LIC	BLTTL	-20040419AAA
26	K26HS	TILLAMOOK OR	135.9	LIC	BLTTL	-20070625ADJ
26	K26IC-D	BREMERTON WA	123.3	CP	BDISTTL	-20051221AJC
28	K28FP	ASTORIA OR	71.0	CP	BDFCDTL	-20090102ACL
28	K28FP	ASTORIA OR	71.0	LIC	BLTTL	-19990727JG
28	K28CQ	HOOD RIVER OR	145.3	CP	BPTT	-20070822AAQ
28	K28CQ	HOOD RIVER, ETC. OR	144.9	LIC	BLTT	-19890324IE
28	K28IH	RAINIER OR	46.4	LIC	BLTT	-20070502ABX
28	KOXI-LD	CAMAS WA	117.2	CP	BDCCDTL	-20061025ADJ
28	KBTC-TV	TACOMA WA	90.5	LIC	BLET	-20061208ABI
29	KEPB-TV	EUGENE OR	283.8	LIC	BLEDT	-20050127AHY
29	K29EG	MILTON, ETC. OR	375.5	LIC	BLTT	-20030107ABA
29	K29AZ	NEWPORT OR	214.2	LIC	BLTT	-20090304AAM
29	K29CI	PRINEVILLE, ETC. OR	308.3	LIC	BLTT	-19911031SK
29	K67AD	THE DALLES OR	176.4	CP	BDISTT	-20071121ACT
29	K29ED	EVERETT WA	172.7	APP	BSTA	-20060602AAA
29	K29ED	EVERETT WA	173.1	CP	BDFCDTT	-20060309AAN
29	K29ED	EVERETT WA	172.7	LIC	BLTT	-20071221AAA
29	K63AW	GRAYS RIVER WA	39.1	CP	BDISTT	-20061212ABF
29	K29FF	KENNEWICK, ETC. WA	305.5	LIC	BLTTL	-20040616AAO
29	KIMA-TV	YAKIMA WA	194.8	LIC	BLCT	-2586
30	KPTV	PORTLAND OR	117.3	LIC	BLCDT	-20001102AAP
30	K30FL	PORT ANGELES WA	176.6	CP	BDFCDTT	-20060919AAE
30	K30FL	PORT ANGELES WA	176.6	LIC	BLTTL	-20000510AAJ
30	KUSE-LP	SEATTLE WA	129.3	CP	BPTTL	-20030221AAF
30	KPDX	VANCOUVER WA	117.3	CP	BPCDT	-20080208ACA
30	KPDX	VANCOUVER WA	117.3	CP MOD	BMPCDT	-20080619AGD
30	KUNW-LD	YAKIMA WA	194.8	CP	BDISDTL	-20080804AFC
31	K31HK	RAINIER OR	46.4	LIC	BLTT	-20070502ABR
31	K59BX	GRAYS RIVER WA	39.1	CP	BDISTT	-20060328AGL
36	K36GU	ROCKAWAY & VICINITY OR	112.9	LIC	BLTT	-20030610AAE
36	KEVE-LP	LONGVIEW WA	47.1	LIC	BLTT	-19931202IF

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

NONE.

## II. NIER 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.

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

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 (12 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 0.125 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized 2X2 Kathrein broadband panel antenna array proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 18.8 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 is calculated to be  $4.4 \mu\text{W}/\text{cm}^2$ , which is 1.2% of  $375 \mu\text{W}/\text{cm}^2$  (the FCC maximum for uncontrolled environments at the Channel 29 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 non-ionizing radiation 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 radiation in excess of FCC guidelines.

May 8, 2009

Erik C. Swanson, P.E.