

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

ERIK C. SWANSON, PE
THOMAS S. GORTON, PE
MICHAEL H. MEHIGAN, EIT

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

JAMES B. HATFIELD, PE
PAUL W. LEONARD, PE
CONSULTANTS

MAURY L. HATFIELD, PE
(1942-2009)

**Engineering Statement
Application for Minor Modification of Digital Flash Cut Permit
Digital TV Translator Station K23GK-D
Channel 23 at Astoria, OR
March 2010**

This Engineering Statement has been prepared on behalf of Oregon Public Broadcasting, in connection with an application for minor modification of the digital flash cut construction permit for TV translator station K23GK-D at Astoria, Oregon.

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, with the exception of an application for digital displacement of K04PH Astoria to operate on digital Channel 24. Oregon Public Broadcasting has secured the consent of the K04PH licensee, Kenneth E. Lewetag, to grant of the instant application. That consent letter is included as an attachment to this application.

Furthermore, it should be noted that the instant application would simply modify the outstanding K23GK-D permit by increasing the facility's ERP by 3 dB. Study has been made of the interference which the K23GK-D permit would cause to the K04PH digital displacement application, and the results of that study show that almost all (99%) of the interference which the proposed facility would

cause to the K04PH application is already caused by the K23GK-D permit. The instant application will add only 27 persons to the interference area affecting the K04PH application, which amounts to less than half a percent of the K04PH application's interference-free population.

The K04PH application is not predicted to cause any interference to reception of the proposed K23GK-D facility.

Therefore, it is believed that the proposed facility can operate with risk of objectionable interference to other facilities.

Summary Study

Census data selected: 2000

Post DTV Transition Database Selected

TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 03-23-2010 Time: 16:47:55

Record Selected for Analysis

K23GK USERRECORD-04 ASTORIA OR US
Channel 23 ERP 6.2 kW HAAT 379. m RCAMSL 00433 m STRINGENT MASK
Latitude 046-17-11 Longitude 0123-53-45
Status APP Zone 2 Border
Dir Antenna Make usr Model USRPAT04 Beam tilt N Ref Azimuth 0.
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	0.007	262.8	13.9
45.0	0.019	322.4	20.5
90.0	0.038	354.3	24.6
135.0	1.699	409.3	48.4
180.0	6.114	411.3	55.8
225.0	1.173	431.8	46.7
270.0	0.623	429.9	42.8
315.0	1.326	406.9	46.8

Contour Overlap to Proposed Station

Station
K52ET 23 TILLAMOOK OR BDISTT20061212ABH causes

Contour overlap to Digital LPTV station

K23GK 23 ASTORIA OR USERRECORD04
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 quiet zone

Proposed facility OK toward Table Mountain

Proposed facility is within the Canadian coordination distance

Distance to border = 216.9km

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
23	K23GK	ASTORIA OR	USERRECORD04

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
22	KPXG-TV	SALEM OR	123.0	CP	BPCDT	-20080305ABK
22	KCPQ	SEATTLE WA	190.7	APP	BDRTCT	-20090603AAV
23	K17AA	COOS BAY, ETC. OR	322.0	CP	BDISDTT	-20090804ABN
23	KEVU-LP	EUGENE OR	261.3	LIC	BLTTA	-20020802AAR
23	K23CU-D	PRINEVILLE OR	308.3	LIC	BLDTL	-20091014AAG
23	K23FS	SUNRIVER, ETC. OR	327.4	LIC	BLTT	-20040408AAW
23	K52ET	TILLAMOOK OR	119.7	CP	BDISTT	-20061212ABH
23	K23KI-D	ELLENBURG WA	285.8	CP	BNPDTL	-20090825AKO
23	K23FU	KENNEWICK & PASCO WA	367.2	LIC	BLTTL	-20040616AAP
23	KRUM-LD	OLYMPIA WA	96.0	LIC	BLDTL	-20090824AAT
23	K05JO	PROSSER WA	318.6	CP	BDISDTL	-20090617AAZ
23	NEW	YAKIMA WA	260.3	APP	BNPDTL	-20090825ANG
24	K04PH	ASTORIA OR	57.0	APP	BDISDTL	-20080819ACU
24	KPWC-LD	FOREST GROVE OR	128.2	CP	BPDTL	-20090203ABG
24	KKEI-CA	PORTLAND OR	123.0	APP	BDISTTA	-20090102ACF
24	KPWC-LD	TILLAMOOK OR	119.7	LIC	BLDTL	-20090107ADZ
24	KRUM-LD	RENTON WA	190.5	CP	BDISDTL	-20091001AKW
24	K24IT-D	SEATTLE WA	80.1	CP	BNPDTL	-20090825AKR
25	K25CG	ABERDEEN WA	72.8	LIC	BLTT	-19890801IB
25	K25CH	CENTRALIA WA	70.8	LIC	BLTT	-20031124AHA
26	K26DB	ASTORIA OR	0.1	LIC	BLTT	-19911016IG
26	K26HS	TILLAMOOK OR	93.6	LIC	BLTTL	-20070625ADJ
31	K31HK	RAINIER OR	81.5	LIC	BLTT	-20070502ABR
31	K31IR-D	GRAYS RIVER WA	32.9	CP	BDISTT	-20060328AGL

%%%

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

The following station failed the de minimis interference criteria.

23D OR ASTORIA USERRECORD04
ERP 6.20 kW HAAT 379.0 m RCAMSL 433.0 m
Antenna usr USRPAT04

Due to interference to the following station and scenario: 1

24D OR ASTORIA BDISDTL 20080819ACU
ERP 5.00 kW HAAT 1.0 m RCAMSL 957.0 m
Antenna CDB 00000000088937

Percent Service lost without proposal:	0.0	to BDISDTL	20080819ACU
Percent Service lost with proposal:	36.0	to BDISDTL	20080819ACU

Proposed station is MX

23A OR ASTORIA	USERRECORD04	APP
24A OR ASTORIA	BDISDTL 20080819ACU	APP

Proposal MX with BDISDTL 20080819ACU scenario 1 of station 13

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 of K23GK 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.

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

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 (13 meters below the antenna radiation center). The worst case power density levels occur at depression angles between 40 and 90 degrees below the horizontal. The calculations in this report assume a worst-case relative field value of 0.150 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Kathrein K723417 panel antenna

array proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 140 Watts at depression angles between 40 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 $27.7 \mu\text{W}/\text{cm}^2$, which is 1.6% of $1757 \mu\text{W}/\text{cm}^2$ (the FCC maximum for controlled environments such as this one at the Channel 23 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.

March 31, 2010

Erik C. Swanson, P.E.