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**Engineering Statement  
Displacement of K40AQ-D  
Channel 24 at Shoshoni, WY  
November 2017**

This Engineering Statement has been prepared on behalf of Central Wyoming College ("CWC"), licensee of digital TV translator station K40AQ-D at Shoshoni, Wyoming. This material has been prepared in connection with a displacement application and request for Special Temporary Authority.

**I. Background and Waiver Request**

The translator currently operates on a channel above Channel 36, which will be the highest channel remaining for terrestrial television broadcasting per the results of the 2017 spectrum auction. The translator licensee has received a 120-day notice from T-Mobile informing it that the translator station is likely to cause interference in areas where the wireless licensee intends to commence operations or FFA testing. Included with this Engineering Statement is a copy of that notice. Termination of operations would need to occur before the Special Displacement Window opens.

Under these circumstances, CWC respectfully requests a waiver of the Displacement Freeze, in accordance with the procedures announced by Public Notice on June 14, 2017. (See DA 17-584, *Incentive Auction Task Force and Media Bureau Set Forth Tools Available to LPTV/Translator Stations Displaced Prior to the Special Displacement Window*.) Grant of this waiver will allow the station to continue providing service to viewers with as little disruption as possible.

Accordingly, CWC is filing both a displacement application, and a request for Special Temporary Authority to begin operations on the requested channel.

## II. 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 facilities with which contour overlap exists. 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.

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

Study created: 2017.11.14 13:15:40

Study build station data: LMS TV 2017-11-13 (71)

Proposal: K40AQ-D D24 LD APP SHOSHONI, WY  
File number: SH024  
Facility ID: 56593  
Station data: User record  
Record ID: 342  
Country: U.S.

Build options:  
Protect records not on baseline channel

No protected stations found.

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D24  
Mask: Simple  
Latitude: 43 26 16.00 N (NAD83)  
Longitude: 107 59 48.00 W  
Height AMSL: 2515.0 m  
HAAT: 0.0 m  
Peak ERP: 1.00 kW  
Antenna: Omnidirectional  
Elev Pattn: Generic  
Elec Tilt: 1.8

49.8 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	1.00 kW	481.5 m	49.1 km
45.0	1.00	403.2	46.7
90.0	1.00	301.5	42.4
135.0	1.00	718.7	54.1
180.0	1.00	829.0	56.0
225.0	1.00	908.3	57.3
270.0	1.00	668.5	53.2
315.0	1.00	500.6	49.8

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m Computed HAAT: 601 m

Distance to Canadian border: 618.2 km

Distance to Mexican border: 1295.4 km

Conditions at FCC monitoring station: Grand Island NE  
Bearing: 106.3 degrees Distance: 835.6 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 147.2 degrees Distance: 430.0 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%

No IX check failures found.

### III. 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 (3 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 0.244 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Scala SL-8 antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 59.5 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 221.0  $\mu W/cm^2$ , which is 62.6% of 353.3  $\mu W/cm^2$  (the FCC maximum for uncontrolled environments at the Channel 24 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.

November 14, 2017

Erik C. Swanson, P.E.