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**Engineering Statement  
Digital Companion Channel for K11QL  
Channel 26 at Clarks Fork, WY  
October 2019**

**I. Background**

This Engineering Statement has been prepared on behalf of Central Wyoming College ("CWC"), licensee of analog TV translator station K11QL. This material has been prepared in connection with an application for a digital companion channel facility on UHF Channel 26.

The attached contour map demonstrates that the proposed DCC noise limited contour overlaps the K11QL 68 dBu F(50,50) contour.

**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 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. Based on the foregoing interference study, it is believed that the proposed facility can operate without risk of interference to other stations. This study was run with a grid spacing of 1.0 km, and a terrain increment of 1.0 km.

Hatfield & Dawson Consulting Engineers

Study created: 2019.10.10 16:27:27

Study build station data: LMS TV 2019-10-07

Proposal: CF-DCC D26 LD APP CLARKS FORK, WY  
File number: K11QL-DCC-26  
Facility ID: 51622  
Station data: User record  
Record ID: 932  
Country: U.S.

Build options:

Protect pre-transition records not on baseline channel

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K25BP-D	D25	LD	LIC	BILLINGS, MT	BLANK0000016513	143.6 km
No	K25BP-D	D25	LD	CP	BILLINGS, MT	BLANK0000073131	134.1
No	K25BP-D	N25	TX	LIC	BILLINGS, MT	BLTTL19990723JD	134.1
No	K25MO-D	D25	LD	CP	GREAT FALLS, MT	BNPDTL20100505AHC	168.3
No	K25OV-D	D25	LD	LIC	CODY, WY	BLANK0000059952	71.0
No	KIDK	D26	LD	CP	IDAHO FALLS, ID	BLANK0000052558	224.7
No	K26OY-D	D26	LD	LIC	MALAD CITY, ID	BLANK0000074786	375.0
No	K26DE-D	D26	LD	LIC	BOZEMAN, MT	BLDTL20101101ACE	151.7
No	K26NN-D	D26	LD	LIC	BRIDGER, ETC., MT	BLANK0000067771	70.6
No	K38MC-D	D26	LD	CP	COLSTRIP, MT	BLANK0000054012	237.7
No	K26GL-D	D26	LD	LIC	COLUMBUS, MT	BLDTT20130807AAR	86.7
No	K26ON-D	D26	LD	LIC	DEER LODGE, ETC., MT	BLANK0000064278	290.7
No	K26KA-D	D26	LD	CP	DRUMMOND, MT	BLANK0000019043	334.8
No	K26KA-D	D26	LD	LIC	DRUMMOND, MT	BLDTT20131122AWS	334.8
No	K26LG-D	D26	LD	LIC	PHILLIPS COUNTY, MT	BLDTT20111116ATZ	347.7
No	K26LQ-D	D26	LD	LIC	WHITE SULPHUR SPRING, MT	BLDTL20120316ABQ	207.9
No	K26LB-D	D26	LD	CP	WORDON, MT	BNPDTL20100510ABT	181.0
No	KCVB-CD	D26	DC	APP	LOGAN, UT	BLANK0000074734	404.1
No	K26LD-D	D26	LD	CP	BUFFALO, WY	BNPDTL20100505AHU	244.2
No	K26NL-D	D26	LD	LIC	GILLETTE, WY	BLANK0000058315	329.1
No	K26LW-D	D26	LD	LIC	SHERIDAN, WY	BLDTT20120614ABH	216.3
No	K38EK-D	D26	LD	LIC	SHOSHONI, WY	BLANK0000083958	208.3
No	K38EK-D	D26	LD	CP	SHOSHONI, WY	BLANK0000053887	208.3
No	K27KP-D	D27	LD	LIC	DRIGGS, ID	BLDTT20111107ARN	178.3
No	K27LH-D	D27	LD	CP	BIG TIMBER, MT	BNPDTL20100505AGP	109.9
No	K27IM-D	D27	LD	LIC	BILLINGS, MT	BLANK0000016512	143.6
No	K27IM-D	D27	LD	CP	BILLINGS, MT	BLANK0000053214	134.1
No	K27IM-D	N27z	TX	LIC	BILLINGS, MT	BLTT20060711ABH	134.1
No	K27LO-D	D27	LD	LIC	EMIGRANT, MT	BLDTT20120619ACT	95.8
No	K27LI-D	D27	LD	CP	SAINT XAVIER, MT	BNPDTL20100505AHB	154.3
No	K40JU-D	D27	LD	CP	Lovell, WY	BLANK0000073054	90.2
No	K33EA	N33	TX	LIC	COLUMBUS, MT	BLTT19940902IF	87.6
No	K34HZ	N34-	TX	LIC	CODY, WY	BLTTL20070628ACK	58.6

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D26  
Mask: Stringent  
Latitude: 44 53 36.90 N (NAD83)  
Longitude: 109 38 28.60 W  
Height AMSL: 2230.7 m (Adjusted based on actual ground elevation calculation)  
HAAT: 0.0 m  
Peak ERP: 0.200 kW  
Antenna: KAT-1X2KBBU (ID 34224) 200.0 deg  
Elev Pattn: Generic

50.0 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.000 kW	-562.4 m	2.8 km
45.0	0.001	-663.9	3.5
90.0	0.008	-551.6	5.4
135.0	0.138	-32.9	10.9
180.0	0.101	-123.8	10.1
225.0	0.116	-103.6	10.4
270.0	0.107	-291.8	10.2
315.0	0.005	-153.5	4.9

Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m Computed HAAT: -310 m

Distance to Canadian border: 456.4 km

Distance to Mexican border: 1422.2 km

Conditions at FCC monitoring station: Grand Island NE  
Bearing: 111.9 degrees Distance: 1012.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 144.2 degrees Distance: 637.6 km

Study cell size: 0.50 km  
Profile point spacing: 0.50 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.

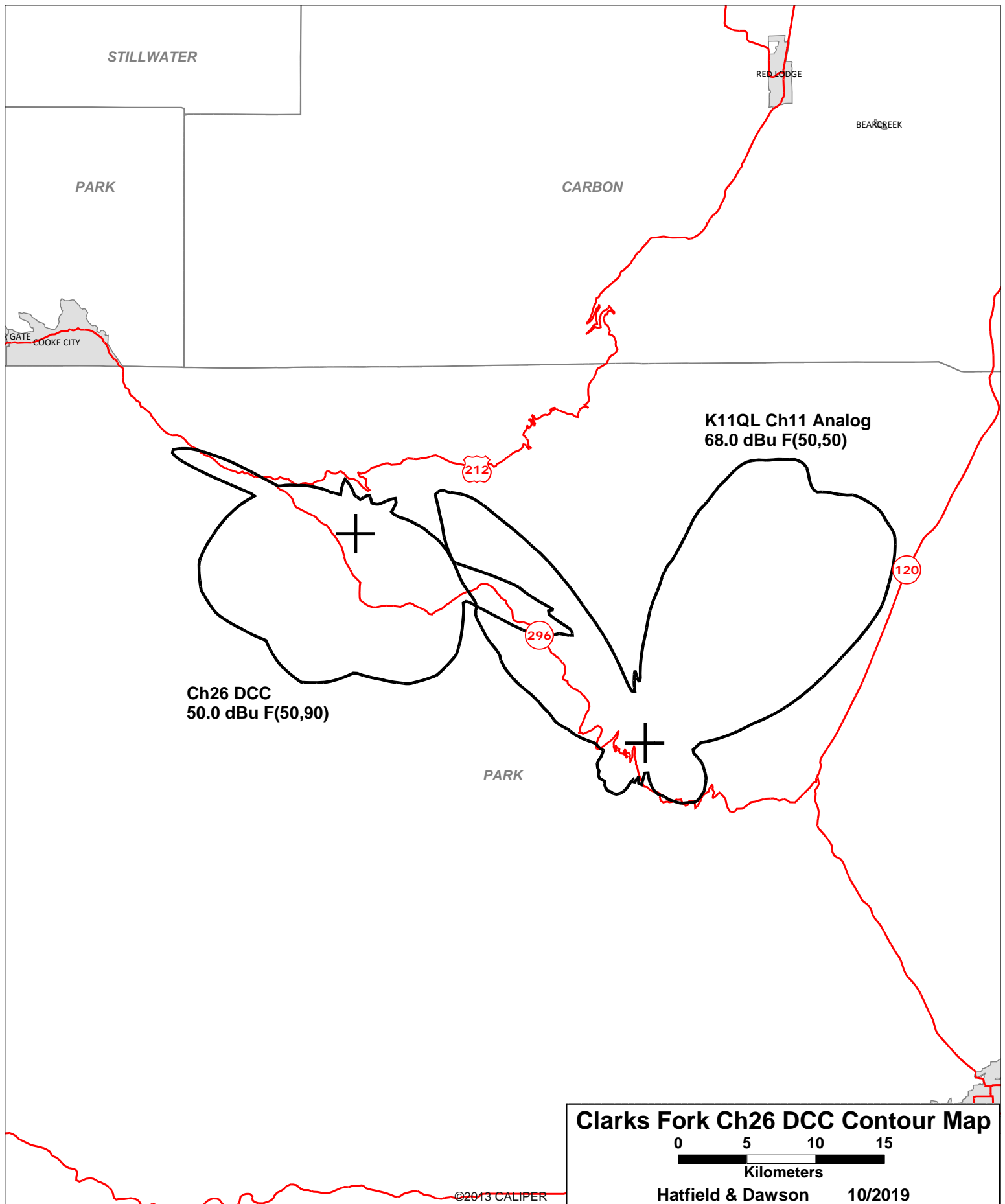
Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground (4 meters below the antenna radiation center). The worst case power density levels occur at depression angles between 45 and 90 degrees below the horizontal. The calculations in this report assume a worst-case relative field value of 0.200 at these angles, based on the manufacturer's vertical plane pattern for the horizontally-polarized Kathrein 1X2KBBU antenna array proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 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 from the proposed facility is calculated to be  $16.7 \mu\text{W}/\text{cm}^2$ , which is 4.6% of  $361.3 \mu\text{W}/\text{cm}^2$  (the FCC maximum for uncontrolled environments at the Channel 26 frequency).

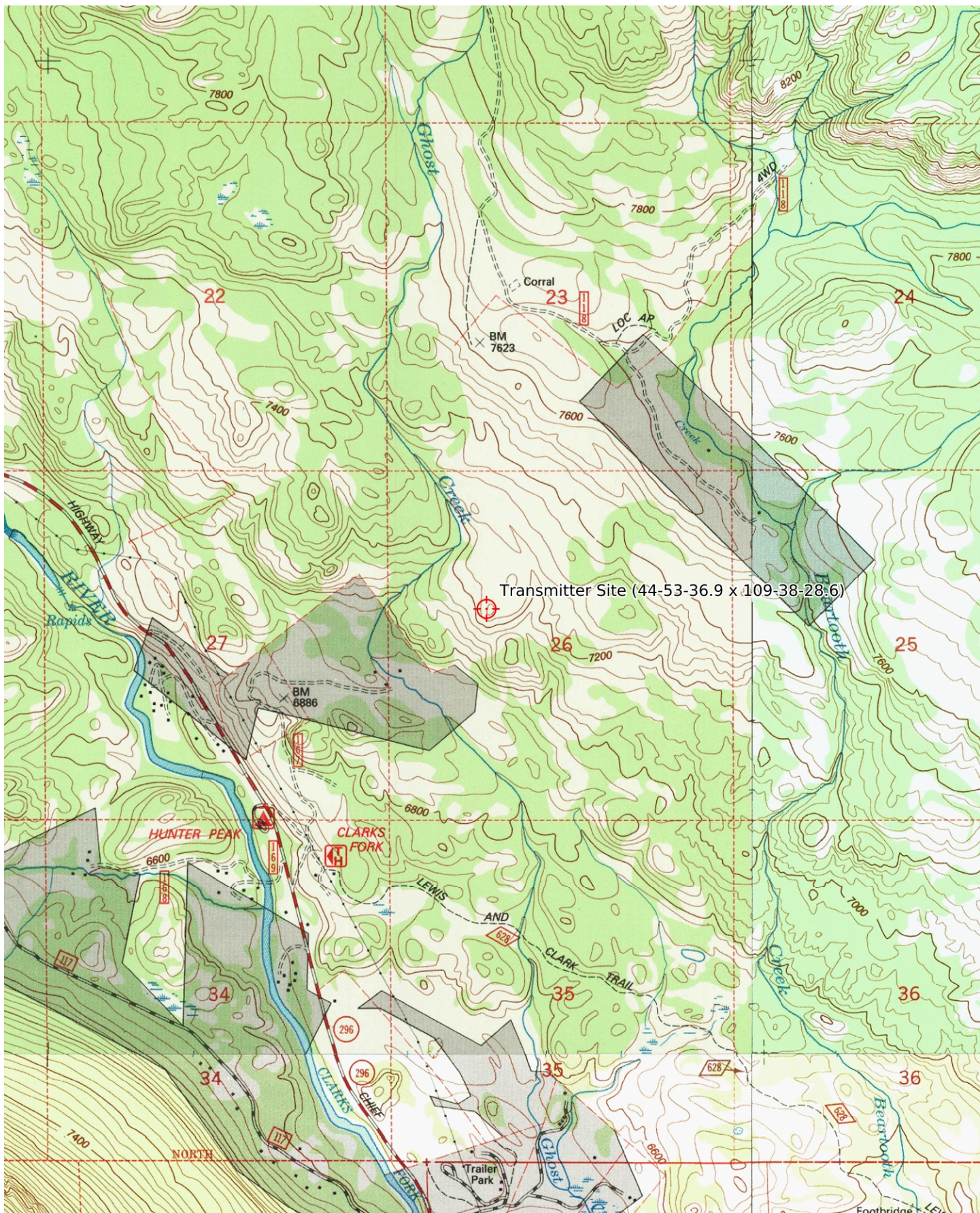
Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken. The permittee/licensee 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.

October 10, 2019

Erik C. Swanson, P.E.







Mercator Projection  
WGS84  
USNG Zone 12TXQ  
CalTopo

