ENGINEERING EXHIBIT

Modification of a Construction Permit for LPTV Station Application

prepared for

Cowles Montana Media
Bozeman, Montana
Facility ID 38576
Ch. 28 (Digital) 6.5 kW

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Statement A

COMPREHENSIVE ENGINEERING STATEMENT

prepared for

Cowles Montana Media

Bozeman, Montana

Facility ID 38576

Ch. 28 (Digital) 6.5 kW

Cowles Montana Media ("Cowles") is the permittee of low power television station KWYB-LD, Channel 28, Bozeman, MT, Facility ID 38576 (LMS File No. 0000080859). *Cowles* is seeking to modify the KWYB-LD antenna type and pattern, and ERP.

Nature of the Proposal

The proposed antenna system for the proposed LWYB-LD operation is an omni-directional Kathrein Model 750 10067 which will be side-mounted on the tower specified in the CP with ASR number 1275571. The modified antenna will remain at 38.1 meters AGL as stated in the original CP.

The proposed digital facility will operate on Channel 28 using a "full service" out of channel emission mask, and an effective radiated power of 6.5 kW, and an antenna height of 1752.6 meters AMSL.

Allocation Considerations

The instant proposal complies with the Commission's interference protection requirements toward all DTV, television translator, LPTV, and Class A stations. A detailed interference study was conducted in accordance with the terrain dependent Longley-Rice point-to-point propagation model, per the Commission's Office of Engineering and Technology Bulletin No. 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69")[1]. The interference study examined the change in interference as experienced by nearby pertinent stations that would result from the proposed facility.

The results of this study shows that any new interference does not exceed the Commission's interference limits (0.5 percent to full service and Class A stations, and 2.0 percent to secondary stations). Accordingly, the instant proposal complies with §74.793

[1] The implementation of OET-69 for this study (*TV Study*) followed the guidelines of OET-69 as specified therein. TV_Study Version 2.2.5 was employed ***with a cell size of 1.00 km and point spacing of 0.10 km***.

regarding interference protection to analog and digital television, low power television, television translator, and Class A television facilities. The results of this study are shown at the end of this document.

International Coordination

The proposed transmitter site is located 373.3 km from the closest point on the U.S.-Canadian border and 1862 km from the U.S. – Mexico border. The proposal's 21 dBμ worst-case contour does not cross the Canadian border. Therefore, International coordination is not required.

Other Allocation Considerations

The nearest FCC monitoring station is at Ferndale, WA at a distance of 926.2 km from the proposed site. The proposed site is also located outside the areas specified in §73.1030(a)(1) and §73.1030(b). Thus, notification of the instant proposal to the National Radio Astronomy Observatory at Green Bank, West Virginia, or the Table Mountain Radio Receiving Zone in Boulder County, Colorado is not required. There are no AM broadcast stations located within 3.2 km (2 miles) of the proposed site according to information extracted from the Commission's engineering database.

Environmental Considerations

The instant proposal is not believed to have a significant environmental impact as defined under §1.1306 of the Commission's Rules. Consequently, preparation of an Environmental Assessment is not required. *Central Minnesota* herein proposes to construct the proposed facility on an existing tower with ASR Number 1058524.

The use of existing antenna support structures has been characterized as being environmentally preferable by the Commission, according to Note 1 of §1.1306 of the FCC Rules. No change in structure height is proposed, thus no change in current structure marking and lighting requirements is anticipated. Therefore, it is believed that this application may be

categorically excluded from environmental processing pursuant to §1.1306 of the Commission's rules.

Human Exposure to Radiofrequency Electromagnetic Field

The proposed operation was evaluated for human exposure to radiofrequency electromagnetic field using the procedures outlined in the Commission's OET Bulletin 65 ("OET 65"). OET 65 describes a means of determining whether a proposed facility exceeds the radiofrequency exposure guidelines adopted in §1.1310. Under present Commission policy, a facility may be presumed to comply with the limits specified in §1.1310 if it satisfies the exposure criteria set forth in OET 65. Based upon that methodology, and as demonstrated in the following, the proposed transmitting system will comply with the cited adopted guidelines.

The KYWB-LD Channel 28 antenna center of radiation will be 38.1 meters above ground level. An effective radiated power of 6.5 kilowatts, horizontally polarized, will be employed utilizing a Kathrein model 750 10067 omni-directional antenna. A "worst-case" relative field value of 20 percent (from 10° to 90° below the horizontal) is assumed for purposes of the calculation. The "uncontrolled/general population" limit specified in §1.1310 for Channel 28 (center frequency 557 MHz) is 371.3 $\mu W/cm^2$.

OET 65's formula for television transmitting antennas is based on the NTSC transmission standards, where the average power is normally much less than the peak power. For the DTV facility in the instant proposal, the peak-to-average ratio is different than the NTSC ratio. The DTV ERP figure herein refers to the average power level. The formula used for calculating DTV signal density in this analysis is essentially the same as equation (10) in OET-65.

$$S = (33.4098) (F^2) (ERP) / D^2$$

Where:

S = power density in microwatts/cm^2
ERP = total (average) ERP in Watts
F = relative field factor
D = distance in meters

Using this formula and the above assumptions, the proposed facility would contribute a power density of 13.3 μW/cm² at two meters above ground level near the antenna support structure, or 3.58 percent of the general population/uncontrolled limit.

§1.1307(b)(3) states that facilities at locations with multiple emitters are categorically excluded from responsibility for taking any corrective action in the areas where their contribution is less than five percent of the pertinent MPE limit. Since the instant situation meets the five percent exclusion test at all ground level areas, the impact of any other facilities near this site may be considered independently from this proposal. Accordingly, it is believed that the impact of the proposed operation should not be considered to be a factor at ground level as defined under §1.1307(b).

Safety of Tower Workers and the General Public

As demonstrated herein, excessive levels of RF energy attributable to the proposal will not be caused at publicly accessible areas at ground level or near the base of the antenna supporting structure. Further, the site is located on a mountain at the end of a trail that is not a site that is typically accessible to members of the public. Consequently, members of the general public will not be exposed to RF levels in excess of the Commission's guidelines. Nevertheless, site access will continue to be restricted and controlled through the use of a locked fence. Additionally, appropriate RF exposure warning signs are currently posted.

With respect to worker safety, it is believed that based on the preceding analysis, excessive exposure would not occur in areas at ground level or at the base of the top mounted tower structure. A site exposure policy will be employed protecting maintenance workers from excessive exposure when work must be performed on the tower or in areas where high RF levels

may be present. Such protective measures may include, but will not be limited to, restriction of access to areas where levels in excess of the guidelines may be expected, power reduction, or the complete shutdown of facilities when work or inspections must be performed in areas where the exposure guidelines would otherwise be exceeded. On-site RF exposure measurements may also be undertaken to establish the bounds of safe working areas. The applicant will coordinate exposure procedures with all pertinent stations.

Conclusion

Based on the preceding, it is believed that the instant proposal complies with all Commission Rules and policies.

tvstudy v2.2.5 (4uoc83)
Database: 192.168.0.58, Study: KWYB_6.5kW_Omni_Pre, Model: Longley-Rice
Start: 2019.10.22 12:18:02

Study created: 2019.10.22 12:18:02

Study build station data: LMS TV 2019-10-21

    Proposal: KWYB-LD D28 LD APP BOZEMAN, MT
 File number: KWYB_6.5kW_Omni
 Facility ID: 38576
Station data: User record
   Record ID: 239
     Country: U.S.

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

Search options:
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K27LH-D	D27	LD	CP	BIG TIMBER, MT	BNPDTL20100505AGP	104.0 km
No	K27CD-D	D27	LD	LIC	BOULDER, MT	BLDTL20090818ACN	97.2
No	K27ME-D	D27	LD	CP	DELL, MT	BNPDTL20100609AID	152.4
No	K27LO-D	D27	LD	LIC	EMIGRANT, MT	BLDTT20120619ACT	56.2
No	KJCX-LD	D27	LD	CP	HELENA, MT	BDCCDTT20140825ACF	122.2
No	K28LE-D	D28	LD	LIC	IDAHO FALLS, ID	BLDTL20140225ABP	238.0
No	KSAW-LD	D28	LD	CP	TWIN FALLS, ID	BLANK0000054775	409.3
No	K28LG-D	D28	LD	LIC	BRIDGER, ETC., MT	BLDTT20110207ADQ	186.0
No	K28ON-D	D28	LD	LIC	CASTLE ROCK, ETC., MT	BLANK0000062952	338.5
No	K28MG-D	D28	LD	CP	DRUMMOND, MT	BNPDTL20100505AFW	189.7
No	K28NB-D	D28	LD	CP	GLEN, MT	BNPDTL20100609AIP	113.7
No	K28OG-D	D28	LD	LIC	KALISPELL & LAKESIDE, MT	BLANK0000064234	353.5
No	K28MQ-D	D28	LD	CP	MISSOULA, MT	BNPDTL20101014ABP	250.6
No	K28MK-D	D28	LD	LIC	PHILLIPS COUNTY, MT	BLDTT20111116ATU	327.1
No	K28KO-D	D28	LD	LIC	SWEETGRASS, ETC., MT	BLDTT20120214ACE	375.3
No	K28AZ	N28	TX	APP	WEST YELLOWSTONE, MT	BLTT19880426IB	98.6
No	K28HL-D	D28	LD	LIC	RIVERTON, WY	BLDTT20120807ABP	343.4
No	K29MM-D	D29	LD	LIC	BILLINGS, MT	BLANK0000064137	227.7
Yes	KDBZ-CD	D29	DC	LIC	BOZEMAN, MT	BLANK0000075047	31.2
No	K29JT-D	D29	LD	CP	BUTTE, MT	BNPDTL20100310ABV	107.4
No	KUHM-TV	D29	DT	LIC	HELENA, MT	BLANK0000004580	136.1
No	KUHM-TV	D29	DT	APP	HELENA, MT	BLANK0000035768	136.1
No	K29IG-D	D29	LD	LIC	SUNLIGHT BASIN, WY	BLDTT20110127AAU	177.7

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: Full Service
   Latitude: 45 38 19.90 N (NAD83)
  Longitude: 111 15 58.40 W
Height AMSL: 1752.6 m
       HAAT: 0.0 m
   Peak ERP: 6.50 kW
    Antenna: Omnidirectional
Elev Pattrn: Generic

50.1 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	6.50 kW	339.9 m	54.1 km
45.0	6.50	331.3	53.7
90.0	6.50	244.6	49.0

135.0	6.50	136.0	42.5
180.0	6.50	86.0	37.8
225.0	6.50	-30.4	26.4
270.0	6.50	269.1	50.3
315.0	6.50	275.5	50.7

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 207 m

Distance to Canadian border: 373.3 km

Distance to Mexican border: 1466.2 km

Conditions at FCC monitoring station: Ferndale WA
Bearing: 297.5 degrees Distance: 926.2 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 139.2 degrees Distance: 781.5 km

Study cell size: 1.00 km
Profile point spacing: 0.10 km

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

Interference to BLANK0000075047 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KDBZ-CD	D29	DC	LIC	BOZEMAN, MT	BLANK0000075047	
Undesireds:	KWYB-LD	D28	LD	APP	BOZEMAN, MT	KWYB_6.5kW_Omni	31.2 km
	KUHM-TV	D29	DT	LIC	HELENA, MT	BLANK0000004580	143.2

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX
3988.4	94,145	3147.6	88,942	3121.5	88,923	3104.5	88,922	0.55
0.00								

Undesired		Total IX	Unique IX, before		Unique IX, after	
KWYB-LD D28 LD APP	22.1	1			17.0	1
KUHM-TV D29 DT LIC	26.1	19	26.1	19	21.1	19

Interference to BLANK0000075047 LIC scenario 2

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KDBZ-CD	D29	DC	LIC	BOZEMAN, MT	BLANK0000075047	
Undesireds:	KWYB-LD	D28	LD	APP	BOZEMAN, MT	KWYB_6.5kW_Omni	31.2 km
	KUHM-TV	D29	DT	APP	HELENA, MT	BLANK0000035768	143.2

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX
3988.4	94,145	3147.6	88,942	3099.5	88,917	3085.4	88,916	0.45
0.00								

Undesired		Total IX	Unique IX, before		Unique IX, after	
KWYB-LD D28 LD APP	22.1	1			14.0	1
KUHM-TV D29 DT APP	48.1	25	48.1	25	40.1	25

Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KWYB-LD	D28	LD	APP	BOZEMAN, MT	KWYB_6.5kW_Omni	
Undesireds:	KDBZ-CD	D29	DC	LIC	BOZEMAN, MT	BLANK0000075047	31.2 km
	KUHM-TV	D29	DT	LIC	HELENA, MT	BLANK0000004580	136.1

Service area		Terrain-limited		IX-free		Percent IX	
6675.3	87,638	5429.1	84,740	5312.3	83,849	2.15	1.05

Undesired	Total IX		Unique IX		Prcnt Unique IX	
KDBZ-CD D29 DC LIC	116.7	891	116.7	891	2.15	1.05