

## ENGINEERING EXHIBIT

### Application for Digital Television Station Construction Permit

prepared for

#### Gray Television Licensee, LLC

KTVH-DT Helena, MT

Facility ID 5290

Ch. 12 17.5 kW 671 m

*Gray Television Licensee, LLC (Gray)* is the licensee of television station KTVH-DT, Channel 12, Facility ID 5290, Helena, MT. KTVH-DT is licensed to operate at 17.5 kW effective radiated power (“ERP”) with a nondirectional antenna having a height above average terrain (“HAAT”) of 713 meters (BLCDDT-20100920ABN). *Gray* herein seeks a Construction Permit to indicate corrected geographic coordinates, ground elevation, and antenna height for the KTVH-DT facility. No change in the transmitter’s actual location or operation is proposed. A waiver is requested of the FCC’s April 5, 2013 freeze on contour extensions.

The KTVH-DT license has recently been assigned to *Gray* (BALCDDT-20140516AAM). As due diligence, it has been determined that the licensed KTVH-DT geographic coordinates and ground elevation do not match those corresponding to the actual tower location. Additionally, the as-built antenna center of radiation (“C/R”) height above ground was found to be lower than the licensed value. The licensed and corrected facility data for KTVH-DT are listed below.

	<u>Lic BLCDDT-20100920ABN</u>	<u>Corrected</u>
Latitude (NAD-27) <sup>1</sup>	46° 49’ 35” N	46° 49’ 30” N
Longitude	111° 42’ 33” W	111° 42’ 13” W
Site Elevation (m AMSL)	2377	2357
Antenna C/R (m AGL)	44	37.3
Antenna C/R (m AMSL)	2421	2394.3
Antenna C/R (m HAAT)	713.2	671.2

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<sup>1</sup>TV station license data has historically specified geographic coordinates referenced to NAD-27, rounded to the nearest second. With the requirement to file minor modification applications via the Licensing and Management System effective October 2, 2014, coordinates must now be supplied in NAD-83. The corrected coordinates referenced to NAD-83 are 46° 49’ 29.4” N-Lat, 111° 42’ 15.6” W-Lon.

Thus, a coordinate correction of five seconds latitude and 30 seconds longitude is necessary, corresponding to a distance of 0.45 km. The antenna C/R elevation above ground level is 6.7 meters lower than the licensed value, and 26.7 meters lower with respect to the antenna's licensed elevation above mean sea level. The correction falls outside of the three seconds described in §73.1690(b)(2) that can be specified in a license modification application and beyond the +2/-4 meter height tolerance specified in §73.1690(c)(1). Thus, a Construction Permit must be obtained as the first step in correcting the KTVH-DT coordinates and antenna height.

As specified herein, the KTVH-DT facility will continue to operate with the currently licensed 17.5 kW ERP, nondirectional. The antenna supporting tower structure is not registered as the overall structure height is less than 61 meters above ground and passes the FCC's TOWAIR program for the corrected site location.

A map is supplied as Figure 1 which depicts the standard predicted coverage contours. This map includes the location of Helena, KTVH-DT's principal community. As demonstrated thereon, the proposed facility complies with §73.625(a)(1) as the entire principal community will be encompassed by the 43 dBμ contour.

The KTVH-DT corrected facility's predicted service population provides a 113.3 percent match of the MB Docket 87-268 Seventh Report and Order Appendix B facility, as detailed in the following table.

**Digital Television Population Summary**

Population Summary (2000 Census) OET Bulletin 69 method	Appendix B	Proposed Correction
Within Noise Limited Contour	198,541	217,285
Not affected by terrain losses	152,678	175,534
Lost to all interference	76	2,700
Net DTV Service	<b>152,602</b>	<b>172,834</b>
Match of Appendix B	---	<b>113.26%</b>

### **Contour Extension – Waiver Request**

The FCC's Public Notice<sup>2</sup> of April 5, 2013 (DA 13-618) imposed limitations on the filing and processing of full power station applications that propose an increase in their authorized noise-limited service contour ("NLSC"). As specified herein, the proposed coordinate correction will place the KTVH-DT NLSC (36 dBμ) entirely within the currently authorized contour location except for several very small regions.

DA 13-618 contemplates waiver of the contour extension limitation for certain cases by stating:

The Bureau will consider, on a case-by-case basis, requests for waiver of the filing limitation imposed by this Public Notice when a modification application is necessary or otherwise in the public interest for technical or other reasons to maintain quality service to the public, such as when zoning restrictions preclude tower construction at a particular site or when unforeseen events, such as extreme weather events or other extraordinary circumstances, require relocation to a new tower site.

For the case at hand, no change is proposed in the actual KTVH-DT facility, which has been in operation since the transition in 2009. A coverage contour comparison is provided in Figure 2, which shows that the correction will result in very small areas of NLSC extension. The total area within the extension consists of 41.4 square kilometers. This area is 0.09 percent of the total area (44,209.0 sq km) within the corrected KTVH-DT NLSC.

Grant of the KTVH-DT coordinate correction would provide corrected license data to accurately represent the as-built KTVH-DT facility. The correction is consistent with the FCC's Public Notice<sup>3</sup> of January 28, 2015 (DA 15-116) advising licensees to modify their licenses to correct errors in operating parameters prior to the Pre-Auction Licensing Deadline of May 29, 2015. A waiver of the DA 13-618 contour extension filing limitation is justified in this case for the reasons stated above.

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<sup>2</sup>"Media Bureau Announces Limitations on the Filing and Processing of Full Power and Class A Television Station Modification Applications, Effective Immediately, and Reminds Stations of Spectrum Act Preservation Mandate," DA 13-618, Public Notice, released April 5, 2013.

<sup>3</sup>"Media Bureau Designates May 29, 2015 As Pre-Auction Licensing Deadline," DA 15-116, Public Notice, released January 28, 2015.

## **Interference and Other Allocation Factors**

As with the licensed facility, the proposed coordinate correction involves expansion of the KTVH-DT service contour beyond that established by Appendix B values. A detailed interference study per OET Bulletin 69<sup>4</sup> shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby digital television and Class A television stations. The interference study output report is provided as Table 1.

The site is located 242 km from the U.S. – Canada border, within the international coordination zone. The corrected KTVH-DT facility parameters (17.5 kW / 671 m HAAT) generally conform to the parameters for KTVH-DT (20.5 kW ERP / 697 m HAAT) recognized in the 2008 US – Canada Post Transition Allotment Plan.<sup>5</sup> Further international coordination may be necessary due to the 0.45 km shift in site location.

The nearest FCC monitoring station is 845 km distant at Ferndale, WA. This exceeds the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is not located within the areas requiring coordination with quiet zones specified in §73.1030(a) and (b). There are no authorized AM stations within three kilometers of the site.

## **Human Exposure to Radiofrequency Electromagnetic Field**

The transmitting location is on Hogback Mountain, 35 km northeast of Helena. Other television and FM radio transmitting facilities are co-located on the same tower structure with KTVH-DT. Gray participates in a radiofrequency (“RF”) electromagnetic field exposure safety program, along with the other broadcasters and FCC licensees that utilize the site area. The applicant considers access to the site area to be controlled as it is a remote location, surrounded by steep terrain, with access via 4-wheel drive vehicle. Deep snow cover further hampers site

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<sup>4</sup>FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”). The implementation of OET-69 for this study followed the guidelines of OET-69 as specified therein. A cell size of 2 km was employed. Comparisons of various results of this computer program (run on a Sun Sparc processor) to the Commission’s implementation of OET-69 show excellent correlation.

<sup>5</sup>Exchange of letters dated August 5, 2008 from FCC to Industry Canada and December 15, 2008 from Industry Canada to FCC, and accompanying allotment parameters.

access in winter months. These factors serve to discourage and restrict casual access, therefore the site is not likely to be visited by the public.

Recent RF exposure measurements have been conducted to evaluate the level of RF exposure in the vicinity of the KTVH-DT site. In September 2014 the licensee of FM station KIMO (Ch. 297C, Facility ID 83110, Townsend, MT) performed a survey of RF electromagnetic field as a condition of licensing a minor modification of KIMO. KIMO is co-located on the same tower with KTVH-DT. The KIMO license application (BLH-20140915AAM) supplies a report of the measurements, which shows that RF levels at ground level do not exceed the occupational / controlled limit. Some locations in close proximity to the KTVH-DT tower were found to exceed the general population / uncontrolled limit, and those locations are marked by numerous RF warning signs that encircle the area.

Based on the recent RF exposure measurements conducted by the licensee of KIMO, KTVH-DT's compliance with the FCC's requirements regarding human exposure to RF electromagnetic field is consistent with the FCC's OET Bulletin 65, which discusses remote sites in the following.

*From Section 4 CONTROLLING EXPOSURE TO RF FIELDS Public Exposure: Compliance with General Population/Uncontrolled MPE Limits* "There may be situations where RF levels may exceed the MPE limits for the general public in remote areas, such as mountain tops, that could conceivably be accessible but are not likely to be visited by the public. In such cases, common sense should dictate how compliance is to be achieved. If the area of concern is properly marked by appropriate warning signs, fencing or the erection of other permanent barriers may not be necessary."

*From Appendix B* "As a general principle, if areas of high RF radiation levels are publicly marked and if access to such areas is impeded or highly improbable (remoteness and natural barriers may be pertinent) then it may be presumed that the facilities producing the RF radiation do not significantly affect the quality of the human environment and do not require the filing of an [E]nvironmental [A]ssessment." "High RF levels are produced at ground level in a remote area not likely to be visited by the public: If the area of concern is marked by appropriate warning signs, an applicant may assume that there is no significant effect on the human environment with regard to exposure of the general public."

Considering the measurements, the general public and workers will not be exposed to RF levels attributable to KTVH-DT in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure

procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from RF electromagnetic field exposure in excess of FCC guidelines.

This exhibit is limited to the evaluation of exposure to RF electromagnetic field. The proposal involves continued use of a top-mounted transmitting antenna on an existing antenna support structure. No tower work or change in structure height is proposed.

### **Certification**

The undersigned hereby certifies that the foregoing statement and associated attachments were prepared by him or under his direction, and that they are true and correct to the best of his knowledge and belief.

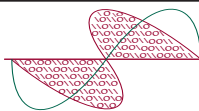


Joseph M. Davis, P.E.  
January 30, 2015

**Chesapeake RF Consultants, LLC**  
207 Old Dominion Road  
Yorktown, VA 23692  
703-650-9600

### List of Attachments

Figure 1	Proposed Coverage Contours
Figure 2	Coverage Contour Comparison
Table 1	OET Bulletin 69 Interference Study
Form 2100	Technical Specifications from FCC Form at Time of Upload

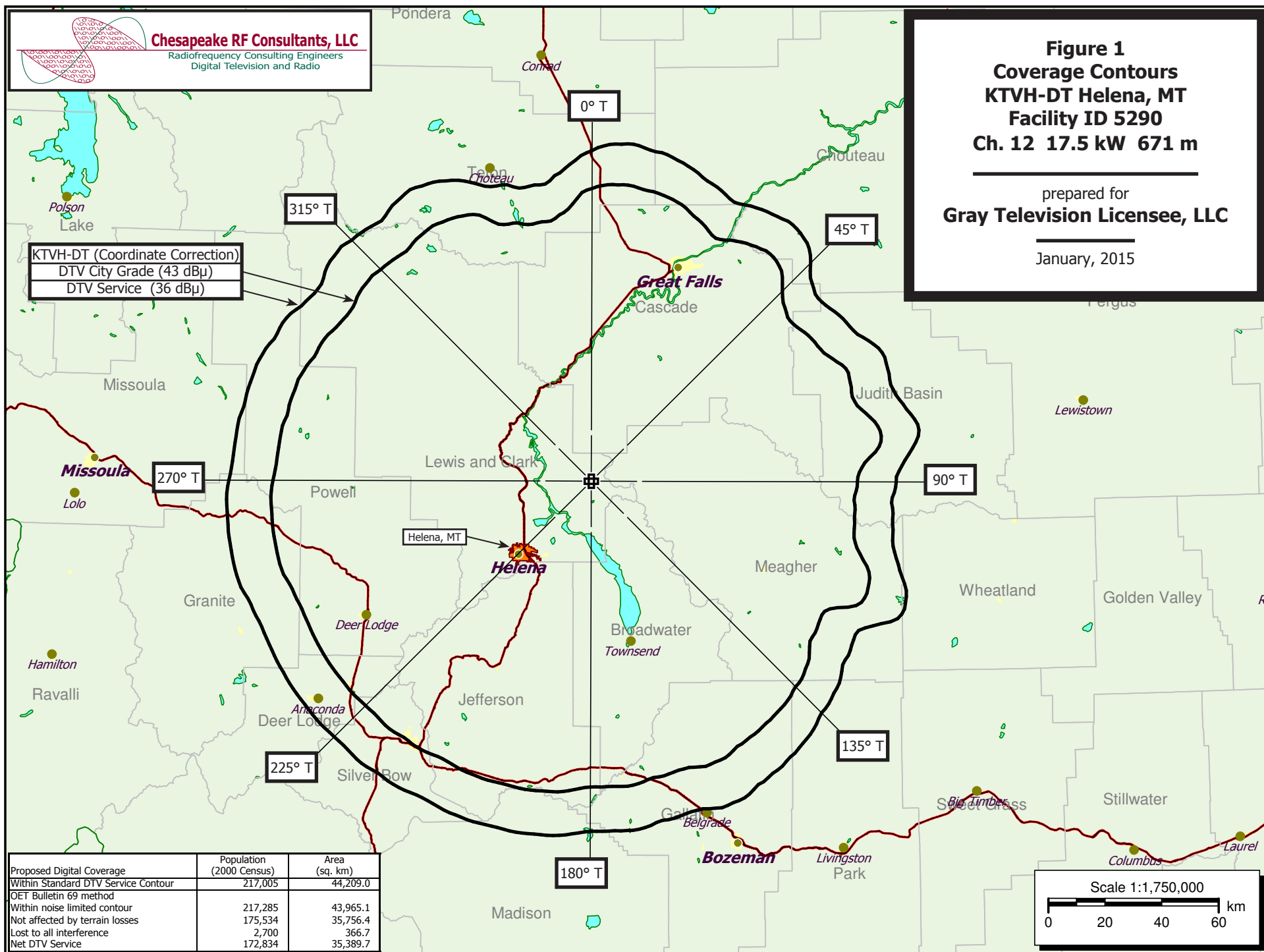


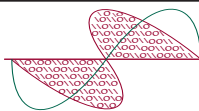
**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 1**  
**Coverage Contours**  
**KTVH-DT Helena, MT**  
**Facility ID 5290**  
**Ch. 12 17.5 kW 671 m**

prepared for  
**Gray Television Licensee, LLC**

January, 2015



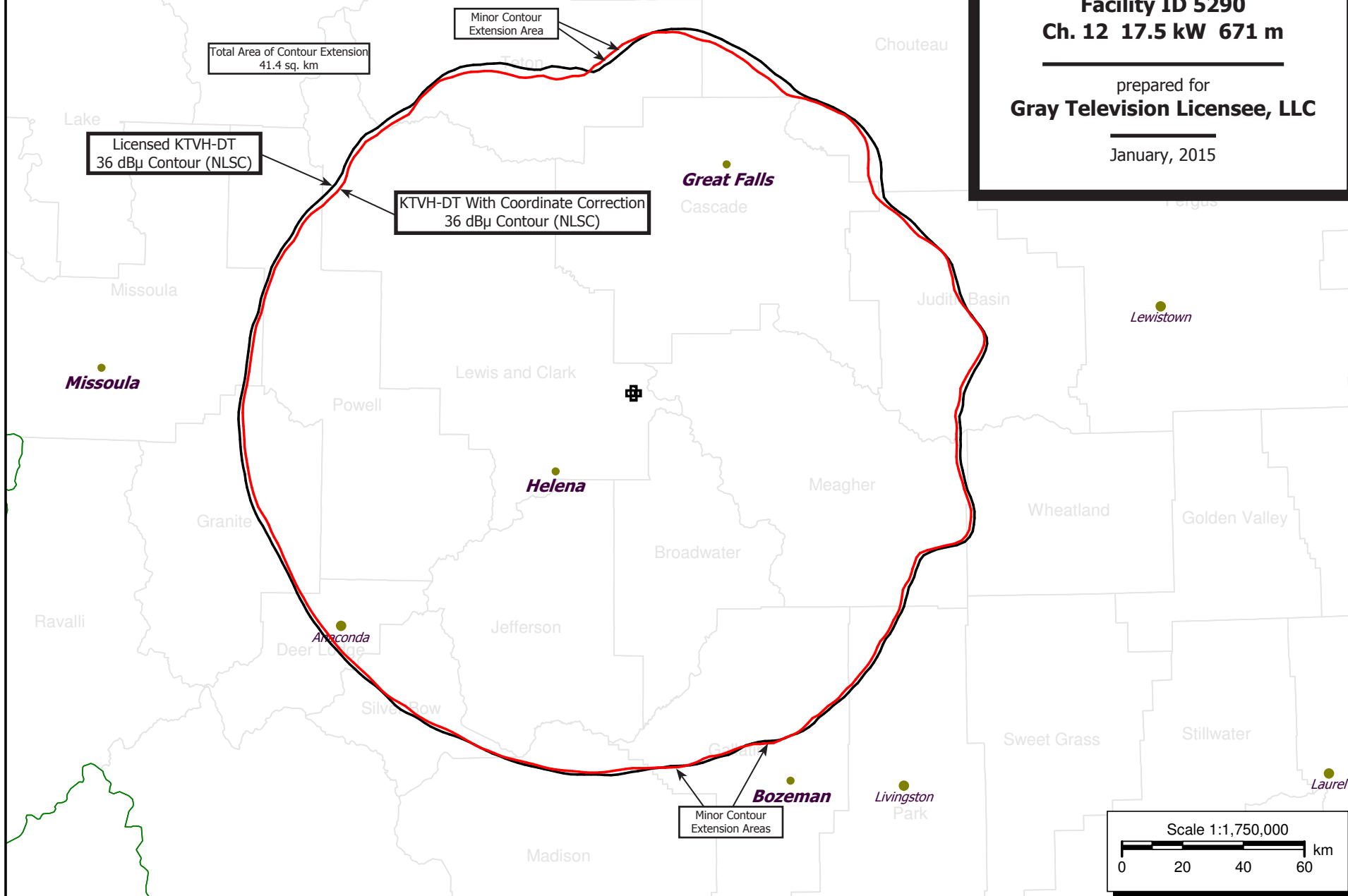


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 2**  
**Coverage Contour Comparison**  
**KTVH-DT Helena, MT**  
**Facility ID 5290**  
**Ch. 12 17.5 kW 671 m**

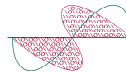
prepared for  
**Gray Television Licensee, LLC**

January, 2015





**Table 1 KTVH-DT OET Bulletin 69 Interference Study**  
(worst-case scenarios shown page 1 of 4)



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TW Census data selected 2000  
Data Base Selected  
/space/software/cdbbs/pt\_tvdb.sff

TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 01-29-2015 Time: 15:30:36

Record Selected for Analysis

KTVH-DT USERRECORD-01 HELENA MT US  
Channel 12 ERP 17.5 kW HAAT 672. m RCMSL 02394 m  
Latitude 046-49-30 Longitude 0111-42-13  
Status APP Zone 2 Border Site number: 01  
Last update Cutoff date Docket  
Comments  
Applicant

Cell Size for Service Analysis 2.0 km/side

Distance Increments for Longley-Rice Analysis 1.00 km

Facility (site # 01) meets maximum height/power limits

Site number	1		
Azimuth	ERP	HAAT	36.0 dBu F(50,90)
(Deg)	(kW)	(m)	(km)
0.0	17.500	584.4	116.4
45.0	17.500	447.8	108.1
90.0	17.500	440.3	107.5
135.0	17.500	559.1	114.9
180.0	17.490	745.3	122.6
225.0	17.340	976.9	127.2
270.0	17.338	980.4	127.3
315.0	17.500	642.5	119.2

Evaluation toward Class A Stations from site # 01

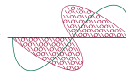
No Spacing violations or contour overlap  
to Class A stations from site # 01

Class A Evaluation Complete

Checks to Site Number 01

Proposed facility OK to FCC Monitoring Stations

**Table 1 KTVH-DT OET Bulletin 69 Interference Study**  
(worst-case scenarios shown page 2 of 4)



**Chesapeake RF Consultants, LLC**  
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Digital Television and Radio

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 = 241.8km

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
12	KTVH-DT	HELENA MT	USERRECORD01	

Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
11	KUFM-TV	MISSOULA MT	172.6	LIC	BLEDT 20101008ACD
12	KUID-TV	MOSCOW ID	401.3	LIC	BLEDT 20060804AFK
13	KBZK	BOZEMAN MT	143.2	LIC	BLCDT 20050825AAQ
13	KECI-TV	MISSOULA MT	176.6	LIC	BLCDT 20100701BOM

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Analysis of Interference to Affected Station 1

Channel	Call	City/State	Application Ref. No.
11	KUFM-TV	MISSOULA MT	BLEDT -20101008ACD

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
11	KFFX-TV	PENDLETON OR	333.5	LIC	BLCDT -20140424AHO
12	KUID-TV	MOSCOW ID	228.7	LIC	BLEDT -20060804AFK
12	KTVH	HELENA MT	172.2	PLN	DTVPLN -DTV0372
12	KTVH-DT	HELENA MT	172.6	APP	USERRECORD-01

Proposal causes no interference

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Analysis of Interference to Affected Station 2

Channel	Call	City/State	Application Ref. No.
12	KUID-TV	MOSCOW ID	BLEDT -20060804AFK

Stations Potentially Affecting This Station

**Table 1 KTVH-DT OET Bulletin 69 Interference Study**  
(worst-case scenarios shown page 3 of 4)



Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
11	KUFM-TV	MISSOULA MT	228.7	LIC	BLEDT -20101008ACD
11	KFFX-TV	PENDLETON OR	132.3	LIC	BLCDDT -20140424AHO
12	KTVH	HELENA MT	400.9	PLN	DTVPLN -DTVP0372
13	KECI-TV	MISSOULA MT	227.9	LIC	BLCDDT -20100701BOM
13	KTVR	LA GRANDE OR	163.5	LIC	BLEDT -20090619AAD
13	KXLY-TV	SPOKANE WA	138.2	LIC	BLCDDT -19991104ABD
13	KXLY-TV	SPOKANE WA	138.2	APP	BMPCDDT -20100819ABL
12	KTVH-DT	HELENA MT	401.3	APP	USERRECORD-01

Proposal causes no interference

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#### Analysis of Interference to Affected Station 3

##### Analysis of current record

Channel	Call	City/State	Application Ref. No.
13	KBZK	BOZEMAN MT	BLCDDT -20050825AAQ

##### Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
12	KTVH	HELENA MT	143.6	PLN	DTVPLN -DTVP0372
13	KECI-TV	MISSOULA MT	283.9	LIC	BLCDDT -20100701BOM
13	KSGW-TV	SHERIDAN WY	316.4	APP	BPCDDT -20130308AEU
13	KSGW-TV	SHERIDAN WY	316.4	LIC	BLCDDT -20051206AEI
12	KTVH-DT	HELENA MT	143.2	APP	USERRECORD-01

Proposal causes no interference

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#### Analysis of Interference to Affected Station 4

##### Analysis of current record

Channel	Call	City/State	Application Ref. No.
13	KECI-TV	MISSOULA MT	BLCDDT -20100701BOM

##### Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
12	KUID-TV	MOSCOW ID	227.9	LIC	BLEDT -20060804AFK
12	KTVH	HELENA MT	176.2	PLN	DTVPLN -DTVP0372
13	KTRV-TV	NAMPA ID	397.5	LIC	BLCDDT -20050516ATS
13	KBZK	BOZEMAN MT	283.9	LIC	BLCDDT -20050825AAQ
13	KTVR	LA GRANDE OR	343.5	LIC	BLEDT -20090619AAD
13	KXLY-TV	SPOKANE WA	253.7	LIC	BLCDDT -19991104ABD
13	KXLY-TV	SPOKANE WA	253.7	APP	BMPCDDT -20100819ABL
12	KTVH-DT	HELENA MT	176.6	APP	USERRECORD-01

Proposal causes no interference

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**Table 1 KTVH-DT OET Bulletin 69 Interference Study**  
(worst-case scenarios shown page 4 of 4)



#### Analysis of Interference to Affected Station 5

##### Analysis of current record

Channel	Call	City/State	Application Ref. No.
12	KTVH-DT	HELENA MT	USERRECORD-01

##### Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
11	KUFM-TV	MISSOULA MT	172.6	LIC	BLEDT -20101008ACD
12	KUID-TV	MOSCOW ID	401.3	LIC	BLEDT -20060804AFK
13	KBZK	BOZEMAN MT	143.2	LIC	BLCDDT -20050825AAQ
13	KECI-TV	MISSOULA MT	176.6	LIC	BLCDDT -20100701BOM

Total scenarios = 1

##### Result key:

Scenario	1	Affected station	5
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Before Analysis

Results for: 12A MT HELENA USERRECORD01 APP

HAAT	672.0 m, ATV ERP	17.5 kW	POPULATION	AREA (sq km)
within Noise Limited Contour			217285	43965.1
not affected by terrain losses			175534	35756.4
lost to NTSC IX			0	0.0
lost to additional IX by ATV			2700	366.7
lost to ATV IX only			2700	366.7
lost to all IX			2700	366.7

Potential Interfering Stations Included in above Scenario 1

13A MT BOZEMAN BLCDDT 20050825AAQ LIC

#####

FINISHED FINISHED FINISHED FINISHED FINISHED FINISHED

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	5290
	State	Montana
	City	HELENA
	DTV Channel	12
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	2

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	No
	ASR Number	
Coordinates (NAD83)	Latitude	46° 49' 29.4" N+
	Longitude	111° 42' 15.6" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	44.5 meters
	Support Structure Height	44.5 meters
	Ground Elevation (AMSL)	2357 meters
Antenna Data	Height of Radiation Center Above Ground Level	37.3 meters
	Height of Radiation Center Above Average Terrain	671.2 meters
	Height of Radiation Center Above Mean Sea Level	2394.3 meters
	Effective Radiated Power	17.5 kW

Antenna  
Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Non-Directional
	Do you have an Antenna ID?	
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	SWR
	Model	SWVHFP4-4/10-12
	Electrical Beam Tilt	1.0
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
DTV and DTS: Elevation Pattern	Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt?	No
	Rotation	
	Uploaded file for elevation antenna (or radiation) pattern data	