# ENGINEERING EXHIBIT

## Application for Construction Permit
## New Replacement Digital Television Translator

prepared for

**Gray Television Licensee, LLC**
WEAU-TV Eau Claire, WI
Replacement Digital Translator
Ch. 25 15 kW

*Gray Television Licensee, LLC ("Gray")* is the licensee of television station WEAU-TV, Facility ID 7893, Eau Claire, WI. WEAU-TV is licensed to operate post-transition on digital Channel 13, its pre-transition analog channel. Pursuant to the procedures adopted in MB Docket 08-253,[1] *Gray* herein proposes to construct a new replacement digital television translator station on Channel 25 to aid in serving its principal community of Eau Claire, WI and other nearby communities.

Since ceasing analog operations on the transition date, WEAU-TV has received numerous calls regarding reception problems, including issues with indoor reception at locations within Eau Claire and other nearby areas. Problems with digital VHF reception by other stations have been widely publicized since the transition date. Further, the WEAU-TV main tower structure collapsed on March 22, 2011 during an ice storm and WEAU-TV is presently silent (see BLSTA-20110331ABR). *Gray* intends to rebuild the WEAU-TV main tower structure. WEAU-TV's Channel 13 operation will resume on or about June 6, 2011 using an emergency antenna which will provide a substantially reduced service area. The Channel 25 translator proposed herein, to be sited on a tower structure located at the WEAU-TV studio facility within Eau Claire (42.7 km from the main WEAU-TV site), would provide supplemental service restoration for the short term and for the long term provide some level of digital UHF fill-in service to aid indoor reception at Eau Claire and vicinity.

[1]Report and Order, *Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Replacement Digital Low Power Television Translator Stations,* MB Docket 08-253, FCC 09-36, released May 8, 2009.

The proposed digital translator facility will employ a new antenna system to be side-mounted on an existing tower structure associated with Antenna Structure Registration number 1033663. No change to the overall structure height is proposed. The maximum effective radiated power is 15 kW utilizing a circularly polarized nondirectional antenna.

Figure 1 depicts the 51 dBμ coverage contour of the proposed translator, along with the WEAU-TV digital Channel 13 noise limited contour (BLCDT-20090622ACW) and the pre-transition analog Channel 13 Grade B contour (BMLCT-20040930BZR). In compliance with §74.787(a)(5), the translator's service contour will not extend beyond WEAU-TV's former analog Grade B contour.

Detailed interference studies per OET Bulletin 69[2] show that the proposal complies with the Commission's interference protection requirements toward all digital television, television translator, LPTV, and Class A stations. The results, summarized in Table 1, show that any new interference does not exceed the Commission's interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility except with respect to those described below which do not present a conflict for the proposal.

A. 87.1 percent interference is predicted to be caused to the application for a new digital LPTV station on Ch. 25, Elk Mound, WI, BNPDTL-20100513AEV. Pursuant to §74.787(a)(5), the WEAU-TV replacement digital translator application has priority over this non-displacement application.

B. 3.45 percent interference is predicted to be caused to the application for a new digital LPTV station on Ch. 25, Eau Claire, WI, BNPDTL-20100203ACO. Pursuant to §74.787(a)(5), the WEAU-TV replacement digital translator application has priority over this non-displacement application.

Accordingly, the instant proposal complies with §74.793 regarding interference protection to digital television, low power television, television translator, and Class A television facilities.

[2]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 1 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.

The proposed site is located 360 km from the U.S. – Canadian border. The worst-case 12.4 dBμ F(50,10) co-channel DTV-to-DTV interfering contour is depicted in Figure 2 and does not extend across the border. Thus it is believed that the instant proposal complies with all international agreements at this time and international coordination will not be necessary.

The nearest FCC monitoring station is 507 km distant at Allegan, MI. 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 nondirectional AM stations within 0.8 kilometers and no directional AM stations within 3.2 kilometers of the site, based on information contained within the Commission's database.

**Human Exposure to Radiofrequency Electromagnetic Field (Environmental)**

The proposed transmitting antenna will be side-mounted on an existing antenna support structure. The use of existing transmitting locations has been characterized as being environmentally preferable by the Commission, according to Note 1 of §1.1306 of the FCC Rules.

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission's OET Bulletin Number 65. Based on OET-65 equation (10), and considering 30 percent antenna relative field in downward elevations, the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is 2.0 $\mu W/cm^2$, which is 0.6 percent of the general population/uncontrolled maximum permitted exposure limit. This is well below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal 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.

**Certification**

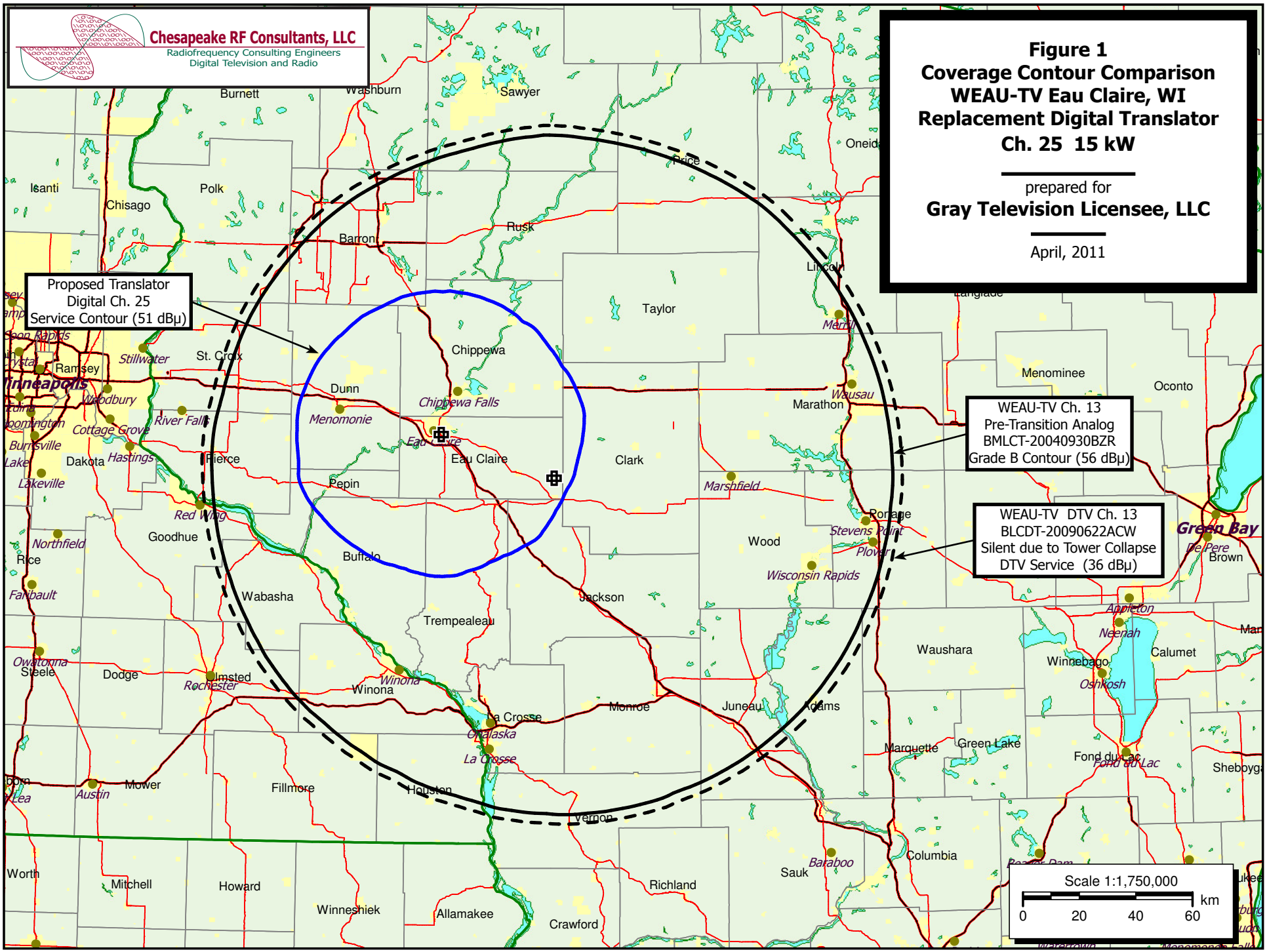
The undersigned hereby certifies that the foregoing statement and associated attachments were prepared by him or under his direction, and that they are true and correct to the best of his knowledge and belief.

Joseph M. Davis, P.E.
April 27, 2011

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

List of Attachments

| | |
|---|---|
| Figure 1 | Coverage Contour Comparison |
| Figure 2 | Interfering Contour to Canada |
| Table 1 | Interference Analysis Results Summary |
| Form 346 | Saved Version of Engineering Sections from FCC Form at Time of Upload |


Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 1
Coverage Contour Comparison
WEAU-TV Eau Claire, WI
Replacement Digital Translator
Ch. 25 15 kW
prepared for
Gray Television Licensee, LLC
April, 2011
Proposed Translator
Digital Ch. 25
Service Contour (51 dBµ)
WEAU-TV Ch. 13
Pre-Transition Analog
BMLCT-20040930BZR
Grade B Contour (56 dBµ)
WEAU-TV DTV Ch. 13
BLCDT-20090622ACW
Silent due to Tower Collapse
DTV Service (36 dBµ)
Scale 1:1,750,000
0 20 40 60 km
Burnett
Washburn
Sawyer
Price
Oneida
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Menominee
Oconto
Chippewa
Dunn
Eau Claire
Clark
Marathon
Wausau
Marshfield
Pepin
Pierce
Dakota
Goodhue
Wabasha
Buffalo
Trempealeau
Jackson
Wood
Portage
Stevens Point
Plover
Wisconsin Rapids
Waushara
Winnebago
Calumet
Brown
Green Bay
De Pere
Appleton
Neenah
Oshkosh
Fond du Lac
Sheboygan
Winona
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Columbia
Sauk
Baraboo
Richland
Crawford
Vernon
Houston
Fillmore
Mower
Olmsted
Dodge
Steele
Rice
Le Sueur
Scott
Carver
Ramsey
Hennepin
Anoka
Washington
Chisago
Isanti
Stillwater
St. Croix
Woodbury
River Falls
Hastings
Cottage Grove
Lakeville
Northfield
Faribault
Red Wing
Rochester
Austin
Worth
Mitchell
Howard
Winneshiek
Allamakee
Minneapolis
Eau Claire
Chippewa Falls
Menomonie
Marshfield
Wisconsin Rapids
Stevens Point
Wausau
Marathon
Green Bay
Appleton
Oshkosh
Fond du Lac
La Crosse
Winona
Rochester
Austin

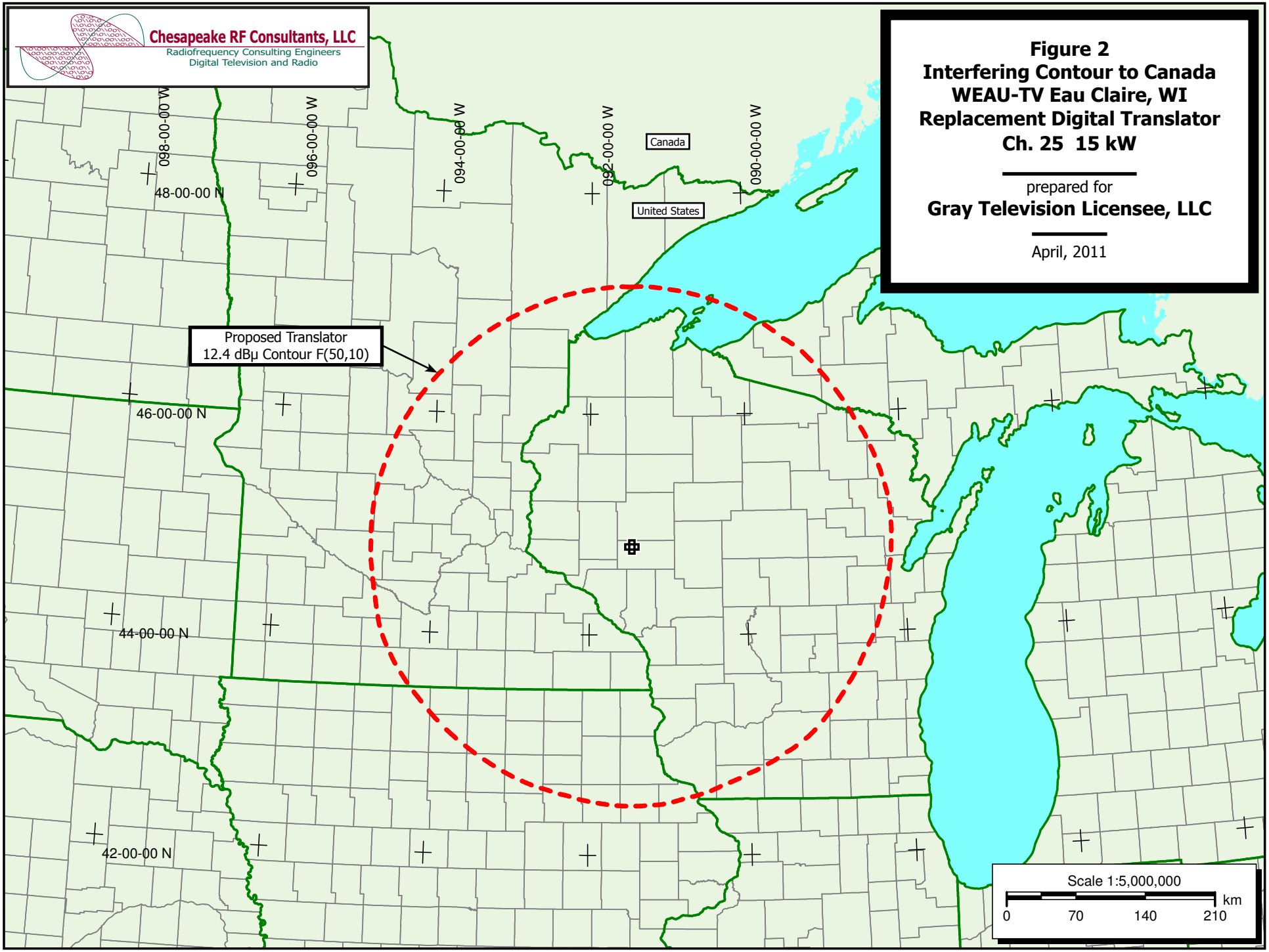

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 2
Interfering Contour to Canada
WEAU-TV Eau Claire, WI
Replacement Digital Translator
Ch. 25 15 kW
prepared for
Gray Television Licensee, LLC
April, 2011
Proposed Translator
12.4 dBμ Contour F(50,10)
Canada
United States
098-00-00 W
096-00-00 W
094-00-00 W
092-00-00 W
090-00-00 W
48-00-00 N
46-00-00 N
44-00-00 N
42-00-00 N
Scale 1:5,000,000
0
70
140
210
km

Table 1

**Interference Analysis Results Summary**

prepared for

**Gray Television Licensee, LLC**

WEAU-TV Eau Claire, WI

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

```
NEW-LD   USERRECORD-01              EAU CLAIRE          WI   US
 Channel 25 ERP 15.    kW   HAAT  206. m  RCAMSL 00484 m STRINGENT MASK
 Latitude 044-48-00  Longitude 0091-27-56
 Nondirectional Antenna
```

| | | | Dist | | | ---Population (2000 Census)---- | |
|---|---|---|---|---|---|---|---|
| Ch. | Call | City/State | (km) | Status | Application Ref. No. | Baseline | New Interference |
| 23 | KQEG-CA | LA CRESCENT MN | 117.7 | LIC | BLTTA-20040602ABA | --- | none |
| 24 | NEW | DODGE CENTER MN | 150.1 | APP | BNPDTL-20090825BFG | --- | none |
| 24 | NEW | ROCHESTER MN | 117.9 | APP | BNPDTL-20090825AJP | --- | none |
| 24 | K24JA-D | WINONA MN | 95.4 | CP | BNPDTL-20090825BYM | --- | none |
| 24 | W24CL-D | GRANTSBURG WI | 139.9 | LIC | BLDTT-20081121AHR | --- | none |
| 24 | WHRM-TV | WAUSAU WI | 140.4 | LIC | BLEDT-20051014AAW | 481,070 | 74 (0.02%) |
| 25 | KTIN | FORT DODGE IA | 323.1 | LIC | BLEDT-20070822ACB | --- | none |
| 25 | KWKB | IOWA CITY IA | 341.9 | CP | BPCDT-20080620AFU | --- | none |
| 25 | KWKB | IOWA CITY IA | 341.9 | LIC | BLCDT-20070130AJQ | --- | none |
| 25 | WMKB-LP | ROCHELLE IL | 361.2 | APP | BSTA-20070627ABX | --- | none |
| 25 | WMKB-LP | ROCHELLE IL | 361.2 | LIC | BLTTL-20070813AFM | --- | none |
| 25 | W25CL | ROCKFORD IL | 341.3 | LIC | BLTT-20020307ABP | --- | none |
| 25 | W25DX | ESCANABA MI | 358.0 | CP | BNPTTL-20000831BBW | --- | none |
| 25 | K25IA-D | MINNEAPOLIS MN | 143.6 | LIC | BLDTT-20090528ACL | 2,764,347 | 0 (0.00%) |
| 25 | K25II | REDWOOD FALLS MN | 278.1 | LIC | BLTT-20050128ARO | --- | none |
| 25 | NEW | ROCHESTER MN | 119.1 | APP | BNPDTL-20100216ADV | 155,470 | 26 (0.02%) |
| 25 | NEW | SAUK CENTRE MN | 302.7 | APP | BNPDTL-20100505AKM | --- | none |
| 25 | K25JZ | WALKER MN | 350.5 | APP | BSTA-20061012ACD | --- | none |
| 25 | K25JZ | WALKER MN | 350.5 | LIC | BLTTL-20070316ACH | --- | none |
| 25 | K25LC-D | WINONA MN | 95.4 | CP | BNPDTL-20090825BYN | 33,400 | 103 (0.31%) |
| 25 | WAST-LP | ASHLAND WI | 214.3 | LIC | BLTTL-20050906AAS | --- | none |
| 25 | NEW | ELK MOUND WI | 22.3 | APP | BNPDTL-20100513AEV | 112,166 | 97,708 (87.11%) * |
| 25 | WCGV-TV | MILWAUKEE WI | 342.1 | APP | BPCDT-20110217ABF | 3,021,282 | 25 (0.00%) |
| 25 | WCGV-TV | MILWAUKEE WI | 342.1 | CP MOD | BMPCDT-20010920AAK | 2,862,875 | 14 (0.00%) |
| 26 | NEW | EAU CLAIRE WI | 9.2 | APP | BNPDTL-20100203ACO | 176,036 | 6,082 (3.45%) * |
| 26 | W26DI-D | LA CROSSE WI | 110.9 | CP | BDCCDTL-20061030AQE | 203,842 | 78 (0.04%) |
| 26 | WXOW | TOMAH WI | 100.3 | CP | BDRTCDT-20101012ADB | --- | none |
| 26 | NEW | TOMAHAWK WI | 158.7 | APP | BNPDTL-20100510AFH | --- | none |
| 26 | NEW | WITTENBERG WI | 194.6 | APP | BDCCDTT-20110414ABL | --- | none |

* The WEAU-TV proposal is for a replacement digital translator facility and therefore has priority over these earlier-filed applications for new digital LPTV stations pursuant to §74.787(a)(5).

**SECTION III - ENGINEERING DATA (Digital)**

**TECHNICAL SPECIFICATIONS**

Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.

**TECH BOX**

1. Channel Number:
25

2. Translator Input Channel No. : 13

3. Primary station proposed to be rebroadcast:

| Facility Identifier | Call Sign | City | State | Channel |
|---|---|---|---|---|
| 7893 | WEAU-TV | EAU CLAIRE | WI | 13 |

4. Antenna Location Coordinates: (NAD 27)
Latitude:
Degrees 44 Minutes 48 Seconds 00 (•) North ( ) South

Longitude:
Degrees 91 Minutes 27 Seconds 56 (•) West ( ) East

5. Antenna Structure Registration Number: 1033663
[ ] Not Applicable [Exhibit 10] [ ] Notification filed with FAA

6. Antenna Location Site Elevation Above Mean Sea Level: 270.9 meters

7. Overall Tower Height Above Ground Level: 293.0 meters

8. Height of Radiation Center Above Ground Level: 213 meters

9. Maximum Effective Radiated Power (ERP): 15 kW

10. Transmitter Output Power: 3.5 kW

11. a.Transmitting Antenna:
Before selecting Directional "Off-the-Shelf", refer to "Search for Antenna Information" under CDBS Public Access (http://licensing.fcc.gov/prod/cdbs/pubacc/prod/cdbs_pa.htm). Make sure that the Standard Pattern is marked Yes and that the relative field values shown match your values. Enter the Manufacturer (Make) and Model exactly as displayed in the Antenna Search.
(•) Nondirectional ( ) Directional "Off-the-shelf" ( ) Directional composite

Manufacturer ERI Model ALP16M4-CSO-25

b. Electrical Beam Tilt: 1.0 degrees [ ] Not Applicable

c. Directional Antenna Relative Field Values: [x] N/A (Nondirectional or Directional "Off-the-shelf")
Rotation (Degrees): [ ] No Rotation

| Degrees | Value | Degrees | Value | Degrees | Value | Degrees | Value | Degrees | Value | Degrees | Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 10 | | 20 | | 30 | | 40 | | 50 | |
| 60 | | 70 | | 80 | | 90 | | 100 | | 110 | |
| 120 | | 130 | | 140 | | 150 | | 160 | | 170 | |
| 180 | | 190 | | 200 | | 210 | | 220 | | 230 | |
| 240 | | 250 | | 260 | | 270 | | 280 | | 290 | |
| 300 | | 310 | | 320 | | 330 | | 340 | | 350 | |
| Additional Azimuths | | | | | | | | | | | |

Relative Field Polar Plot

**NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.**

12. **Out-of-channel Emission Mask:** ( ) Simple (•) Stringent

**CERTIFICATION**

13. **Interference** : The proposed facility complies with all of the following applicable rule sections. 47.C.F.R Sections 74.709, 74.793(e), 74.793(f), 74.793(g), 74.793(h), 74.794(b) and 73.1030.
(•) Yes ( ) No
See Explanation in [Exhibit 11]

14. **Environmental Protection Act.** The proposed facility is excluded from environmental processing under 47. C.F.R. Section 1.1306 (i.e., The facility will not have a significant environmental impact and complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine RF compliance, an **Exhibit is required.**
(•) Yes ( ) No
See Explanation in [Exhibit 12]

By checking "Yes" above, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.

15. **Channels 52-59.** If the proposed channel is within channels 52-59, the applicant certifies compliance with the following requirements applicable

15. **Channels 52-59.** If the proposed channel is within channels 52-59, the applicant certifies compliance with the following requirements, as applicable:

☐ The applicant is applying for a digital companion channel for which no suitable channel from channel 2-51 is available.

☐ Pursuant to Section 74.786(d), the applicant has notified, within 30 days of filing this application, all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.

16. **Channels 60-69.** If the proposed channel is within channels 60-69, the applicant certifies compliance with the following requirements, as applicable:

☐ Pursuant to Section 74.786(e), the applicant has notified, within 30 days of filing this application , all commercial wireless licenses of the spectrum comprising the proposed TV channel and the first adjacent channels thereto, for which the proposed digital LPTV or TV translator antenna site lies inside the licensed geographic boundaries of the wireless licensees or within 75 miles and 50 miles, respectively, of the geographic boundaries of co-channel and adjacent-channel wireless licensees.

☐ Pursuant to Section 74.786(e), the applicant proposing operation on channel 63, 64, 68 and 69 ("public safety channels") has secured a coordinated spectrum use agreements(s) with 700 MHz public safety regional planning committee(s) and state administrator(s) of the region(s) and state(s) within which the antenna site of the digital LPTV or TV translator station is proposed to locate, and those adjoining regions and states with boundaries within 75 miles of the proposed station location.

☐ Pursuant to Section 74.786(e), the applicant for a channel adjacent to channel 63, 64, 68 or 69 has notified, within 30 days of filing this application, the 700 MHz public safety regional planning committee(s) and state administrator(s) of the region and state containing the proposed digital LPTV or TV translator antenna site and regions and states whose geographic boundaries lie within 50 miles of the proposed LPTV or TV translator antenna site.

**PREPARERS CERTIFICATION ON PAGE 3 MUST BE COMPLETED AND SIGNED.**

---

## SECTION III PREPARER'S CERTIFICATION

I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

| Name | Relationship to Applicant (e.g., Consulting Engineer) |
|---|---|
| JOSEPH M. DAVIS, P.E. | CONSULTING ENGINEER |
| Signature | Date |
| | 4/27/2011 |

| Mailing Address |
|---|
| CHESAPEAKE RF CONSULTANTS, LLC<br>207 OLD DOMINION ROAD |

| City | State or Country (if foreign address) | Zip Code |
|---|---|---|
| YORKTOWN | VA | 23692 - |

| Telephone Number (include area code) | E-Mail Address (if available) |
|---|---|
| 7036509600 | JOSEPH.DAVIS@RF-CONSULTANTS.COM |