

ENGINEERING EXHIBIT

Application for Construction Permit

prepared for

CBS Broadcasting Inc.

WWJ-DT Detroit, MI

Facility ID 72123

Ch. 44 345 kW 323 m

CBS Broadcasting Inc. ("CBS") is the licensee of television station WWJ-TV, digital Channel 44 and analog Channel 62, Detroit, MI. *CBS* is licensed to operate the WWJ-DT digital Channel 44 facility at 200 kW effective radiated power ("ERP") and an antenna height above average terrain ("HAAT") of 323 meters (file number BLCDT-19990720LH).

The FCC's *Seventh Report and Order and Eighth Further Notice of Proposed Rulemaking ("SR&O")*¹ in Media Bureau Docket 87-268 sets forth a DTV allotment table for the post-transition period. Appendix B of the *SR&O* provides channel and other technical parameters for each eligible television station. The Appendix B facility parameters for WWJ-DT specify continued operation on Channel 44 at 345 kW ERP and 323 meters antenna HAAT. The Appendix B ERP does not match the licensed WWJ-DT facility (200 kW / 323 meters). *CBS* desires to operate WWJ-DT with its full Appendix B facility.

As described in the recent Report and Order in the Third Periodic Review,² stations such as WWJ-DT (*i.e.*, those that that will remain on their pre-transition DTV channel that do not have an authorization which matches Appendix B and desires to construct the facility described in Appendix B) must file an application for construction permit and are encouraged to do so

¹*Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service*, MB Docket No. 87-268, FCC 07-138, released August 6, 2007.

²*Third Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 07-91, FCC 07-228, released December 31, 2007.

immediately. Accordingly, the instant application seeks a construction permit for WWJ-DT to operate with its Appendix B facilities of 345 kW ERP and 323 meters antenna HAAT.

Continued use of the licensed non-directional antenna system is proposed. A geographic coordinate change of one second latitude is also specified herein to conform to FCC Antenna Structure Registration number 1003429 and Appendix B. No changes in actual transmitting facility location, antenna height, or the existing antenna structure's overall height are proposed.

A map is supplied as **Figure 1**, which depicts the standard predicted coverage contours. This map includes the boundaries of Detroit, WWJ-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 48 dB μ contour.

A detailed interference study per OET Bulletin 69³ shows that the proposal complies with the Commission's 2% / 10% *de minimis* interference limits for operation during the transition. The results of the interference study, summarized in **Table 1**, indicate that any new interference does not exceed the *de minimis* limit. Protection requirements towards authorized Class A stations are satisfied. Thus, this proposal complies with the provisions of §73.623(c)(2) of the Commission's rules.

Regarding impact to post-transition operations, no interference analysis is necessary as the proposal matches the WWJ-DT Appendix B parameters.

³FCC 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 standard 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.

Canadian Allocation Considerations

The WWJ-DT transmitter site is located 16.9 km from the U.S. - Canadian border and is thus within the 400 km coordination zone. Accordingly, the proposal's impact on Canadian facilities is summarized herein, based on the Canadian allotments and procedures stated in the *Letter of Understanding*⁴ (“*LOU*”) regarding digital television along the U.S. - Canadian Border.

The closest co-channel Canadian facility listed in the *LOU* that might be impacted by the proposed WWJ-DT facility is NTSC Channel 44, Stratford, ON, 208.6 km distant. Stratford Ch. 44 is a Canadian Class “A” allotment, having a maximum permissible ERP and HAAT of 10 kW and 100 meters, respectively, according to Table 4.3.3 of the *LOU*. The proposed WWJ-DT facility exceeds the maximum Class VL as specified in Table 4.3.1 of the *LOU* for DTV operation during the transition, so the “Step 1” minimum distance separation tables are not applicable.

However, under a “Step 2” analysis the *LOU* provides for coordination of facilities even if the minimum distance requirements are not met or cannot be employed. A study using pertinent TV propagation curves was performed (per the *LOU*), which showed that any resulting interference to the Stratford Ch. 44 allotment will not affect population in excess of the *LOU*'s 2 percent limit.

The attached **Figure 2** provides a depiction of the predicted interference that would be caused to the Stratford Ch. 44 facility from the proposed WWJ-DT facility. The 64 dB μ F(50,50) contour for Stratford Ch. 44 is “protected.” The proposed WWJ-DT facility's F(50,10) interfering contour⁵ of 46.2 dB μ , which assumes the use of receive antenna directivity, is also supplied on the map. As shown on **Figure 2**, no overlap exists between these contours.

⁴*Letter of Understanding Between the Federal Communications Commission of the United States of America and Industry Canada Related to the Use of the 54-72 MHz, 76-88 MHz, 174-216 MHz, and 470-806 MHz Bands for the Digital Television Broadcasting Service Along the Common Border*, September 2000.

⁵The 46.2 dB μ F(50,10) interfering contour level was established by the protected 64 dB μ signal level, minus 33.8 dB (DTV into NTSC D/U ratio per the *LOU* Appendix 2 paragraph 2), plus 16 dB (receive antenna front-to-back ratio per the *LOU* Appendix 2, paragraph 1). $64 \text{ dB}\mu - 33.8 + 16 = 46.2 \text{ dB}\mu$

A small interference area does result in certain locations, where the receiving antenna's discrimination⁶ is not effective (as the desired and the undesired transmitters are along similar azimuths). The proposed WWJ-DT "worst-case" interfering contour level of 30.2 dBμ F(50,10) is also depicted on **Figure 2**. The predicted interference area is shown where the protected Stratford Ch. 44 signal level is exceeded by the interfering proposed WWJ-DT signal level, using the Desired/Undesired ratio specified in the *LOU*. As shown on **Figure 2**, a small area of interference is predicted, affecting 1,404 persons within the Stratford Ch. 44 64 dBμ contour. This level of interference, 1.62 percent of the 86,655 persons within the Stratford Ch. 44 64 dBμ contour, does not exceed the 2 percent limit specified in the *LOU*.

The situation with respect to other Canadian co-channel NTSC stations is depicted in **Figure 3**. The proposed WWJ-DT F(50,10) 30.2 dBμ interfering contour overlaps a portion of the Ch. 44 Normandale, ON 64 dBμ contour area. Considering receive antenna directivity, the WWJ-DT 46.2 dBμ interfering contour is clear to Normandale by a wide margin, and no area of predicted interference results. The 30.2 dBμ contour overlap area is not subject to predicted interference due to the benefit offered by receive antenna discrimination. Three other NTSC co-channel stations are far from overlap by the WWJ-DT 30.2 dBμ contour (Sault Ste Marie, Killarney, and Peterborough, all ON).

Several Canadian NTSC "taboo" related stations are also near enough to WWJ-DT for contour overlap evaluation. The particular stations and overlap situations are summarized below, none of which involve interference to a Canadian station over Canadian land.

<u>Ch.</u>	<u>City</u>	<u>Summary</u>
29	Sarnia - Oil Springs, ON	Class C: No predicted interference on Canadian land (Figure 4)
42	Sarnia, ON	Class C: No predicted interference on Canadian land (Figure 5)

⁶A standard fourth-power cosine function as specified in the Commission's OET Bulletin 69 was employed as the receiving antenna pattern. Where the receive antenna directivity is not effective, the interfering contour level is 64 dBμ - 33.8 = 30.2 dBμ.

48 Chatham, ON

Class B: No predicted interference
(Figure 6)

Finally, with respect to protection of Canadian DTV assignments, the proposed WWJ-DT (345 kW / 323 m) is equivalent to (or less than) a Class VU facility (550 kW / 300 m) as specified in Table 4.3.2 of the *LOU* for DTV operation after the transition. Therefore, the *LOU* “Step 1” minimum distance separation Table 4.2.1 may be used to evaluate compliance. The only Canadian DTV allotment close enough to warrant review is a Class C allotment for Channel 44 at Severn Falls, ON, 391.4 km distant. The co-channel Class VU - C required separation distance is 340 km, which is satisfied in this instance.

Based on the above summary, the instant proposal complies with the U.S. - Canadian *LOU*.

Other Allocation Considerations

The nearest FCC monitoring station is 229.3 km distant at Allegan, MI. This exceeds by a great margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The 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.

Based on information extracted from the Commission’s engineering database, the non-directional nighttime transmitter site for WRDT(AM) (560 kHz, Monroe, MI, BL-19970820KF) is located 0.97 km from the proposed WWJ-DT. This is beyond the 0.8 km distance the Commission generally applies for non-directional AM station antenna pattern disturbance considerations. The daytime WRDT operation is directional, but at a site located well removed from WWJ-DT (65.3 km) such that there will be no impact. Even if an AM station were near enough where pattern disturbance may be a concern (*i.e.*, within 0.8 km for non-directional or 3.2 km for directional), since the instant proposal merely involves an increase in transmitter power (no tower or antenna construction work is necessary) there would be no change in conditions with respect to any such AM station.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposal involves use of an existing transmitting antenna, and no tower or antenna construction work is necessary to carry out this proposal. 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. 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.

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 10 percent antenna relative field in downward elevations (pattern data shows less than 10 percent relative field at angles 10 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $1.1 \mu\text{W}/\text{cm}^2$, which is 0.3 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.
January 30, 2008

Chesapeake RF Consultants, LLC
11993 Kahns Road
Manassas, VA 20112
703-650-9600

List of Attachments

Figure 1	Proposed Coverage Contours
Table 1	Transition Interference Analysis Results Summary
Figure 2	Canadian Allocation – Stratford, Ontario
Figure 3	Canadian Allocation – Various Co-Channel
Figure 4	Canadian Allocation – Sarnia – Oil Springs, Ontario
Figure 5	Canadian Allocation – Sarnia, Ontario
Figure 6	Canadian Allocation – Chatham, Ontario
Form 301	Saved Version of Engineering Sections from FCC Form at Time of Upload

This material was entered January 30, 2008 for filing electronically. Since the FCC's electronic filing system may be accessed by anyone with the applicant's name and password, and electronic data may otherwise be altered in an unauthorized fashion, we cannot be responsible for changes made subsequent to our entry of this data and related attachments.

Figure 1
Proposed Coverage Contours
WWJ-DT Detroit, MI
Facility ID 72123
Ch. 44 345 kW 323 m

prepared for
CBS Broadcasting Inc.

January, 2008



Proposed WWJ-DT
 DTV Service (41 dBu)
 DTV City Grade (48 dBu)

Within 41 dBu Contour	
Area (sq. km)	25,538
U.S. Population (2000 Census)	5,489,191

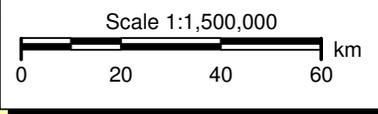


Table 1

**Transition Period
Interference Analysis Results Summary**

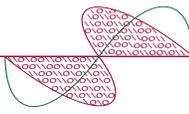
prepared for

CBS Broadcasting Inc.

WWJ-DT Detroit, MI



Ch.	Call	City/State	Dist (km)	Status	Application Ref. No.	-----Population (1990 Census)-----		
						Baseline	New Interference (2.0% max)	Total Interference (10.0% max)
30	WGTE-TV	TOLEDO OH	90.5	LIC	BMLET-19971204LC	---	none	n/a
36	WUPW	TOLEDO OH	90.9	LIC	BLCT-19850930KG	---	none	n/a
40	WLMB	TOLEDO OH	104.7	LIC	BLCT-19981029KE	---	none	n/a
43	WZPX	BATTLE CREEK MI	157.1	LIC	BLCT-19961017KE	---	none	n/a
43	WTVS	DETROIT MI	0.0	LIC	BLEDT-20001117ABV	---	none	n/a
43	WTVS-DT	DETROIT MI	12.1	PLN	DTVPLN-DTVP1229	4,719,766	4,359 (0.09%)	4.47%
43	WUAB	LORAIN OH	169.0	LIC	BLCT-20020517AAH	---	none	n/a
44	WSNS-TV	CHICAGO IL	373.1	LIC	BLCT-20000110AAU	---	none	n/a
44	WDTI	INDIANAPOLIS IN	380.7	CP MOD	BMPEDT-20070523ACG	---	none	n/a
44	WDTI-DT	INDIANAPOLIS IN	383.6	PLN	DTVPLN-DTVP1262	---	none	n/a
44	WZPX-DT	BATTLE CREEK MI	157.1	PLN	DTVPLN-DTVP1269	1,861,343	36,396 (1.96%)	2.01%
44	WOUC-TV	CAMBRIDGE OH	305.5	LIC	BLET-20050427AAE	514,806	340 (0.07%)	1.69%
44	WTLW	LIMA OH	205.2	LIC	BMLCT-20010123ABE	480,366	1,912 (0.40%)	0.40%
45	WDIV-DT	DETROIT MI	4.7	PLN	DTVPLN-DTVP1303	---	none	n/a
45	WLLA-DT	KALAMAZOO MI	187.7	PLN	DTVPLN-DTVP1304	---	none	n/a
45	WLLA	KALAMAZOO MI	187.7	LIC	BLCDDT-20070529AEA	---	none	n/a
46	WBSF	BAY CITY MI	126.5	LIC	BLCT-20061006ACR	---	none	n/a
47	WSYM-TV	LANSING MI	121.3	LIC	BLCT-19821210KE	---	none	n/a
52	WGGN-TV	SANDUSKY OH	121.0	LIC	BLCT-19940310KE	---	none	n/a



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

Figure 2
Canadian Allocation
Stratford, Ontario
WWJ-DT Detroit, MI
Facility ID 72123
Ch. 44 345 kW 323 m

prepared for
CBS Broadcasting Inc.
 January, 2008

Proposed WWJ-DT
 46.2 dBμ F(50,10)
 30.2 dBμ F(50,10)

Predicted
 Interference Area

Analog Ch. 44
 Class A
 10 kW 100 m HAAT
 Stratford, ON
 64 dBμ F(50,50)

Canadian Population (1996 Census Data)		
Total within Stratford Ch. 44 64 dBμ Contour		86,655
Total within predicted interference area		1,404

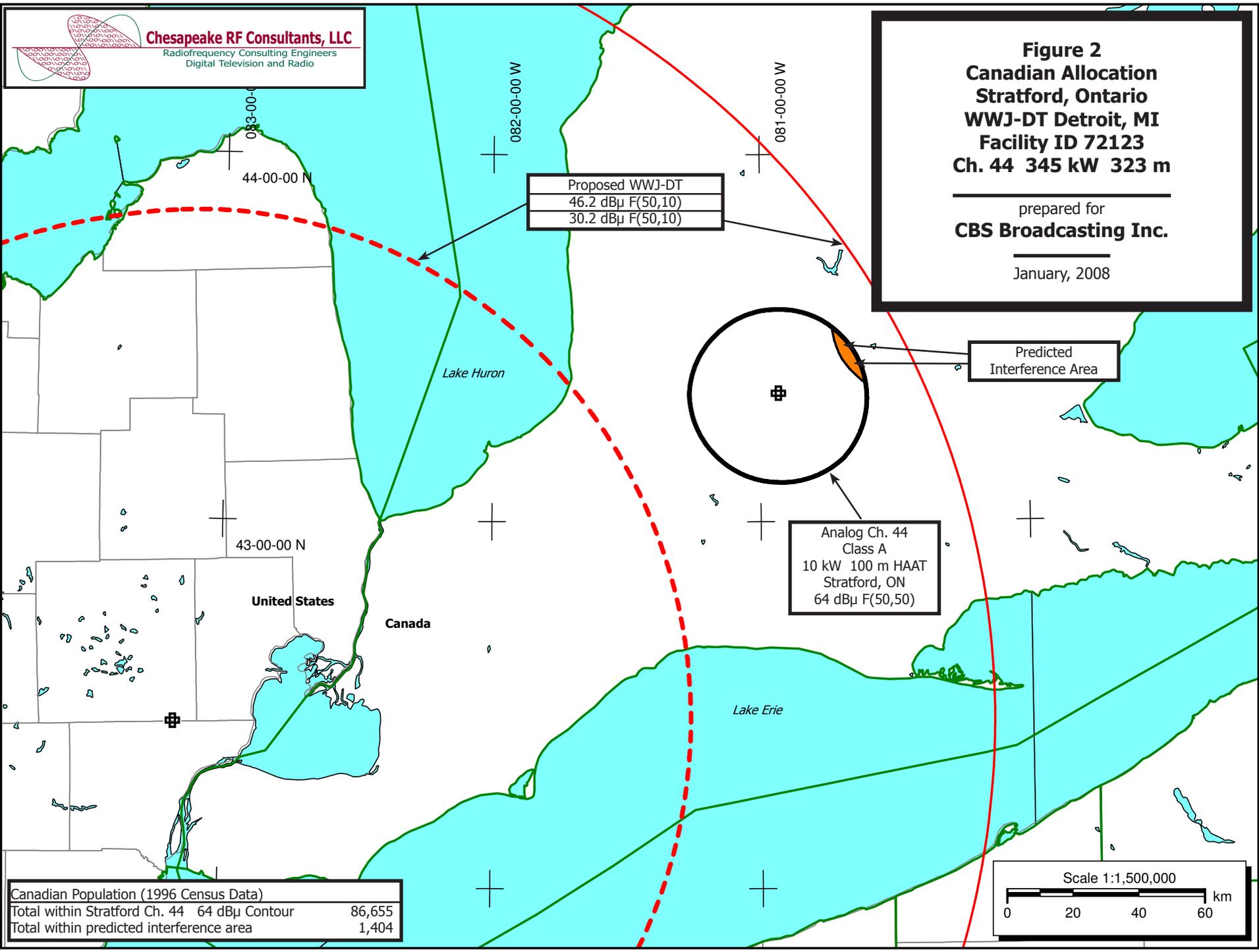
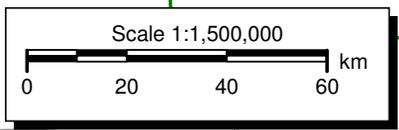
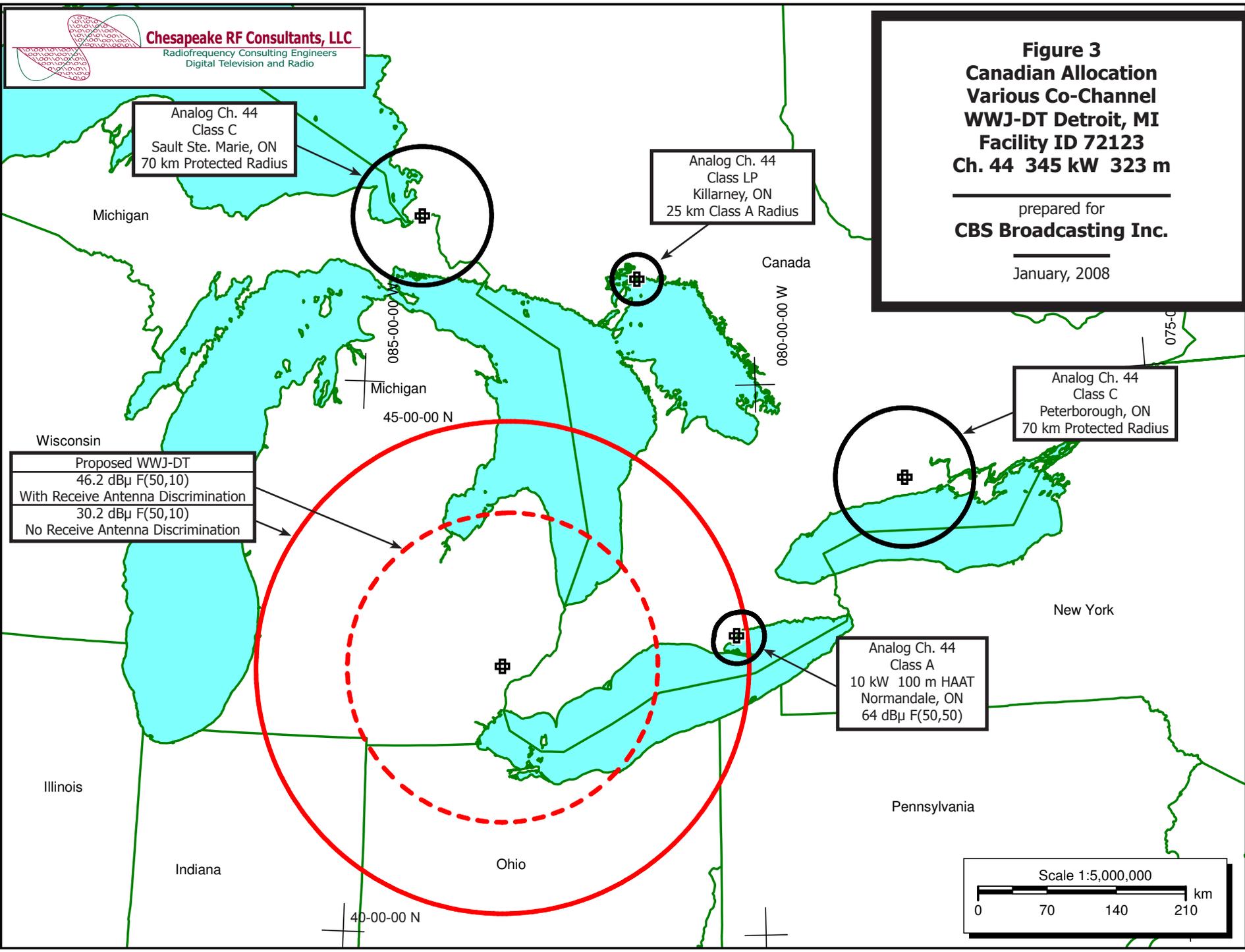


Figure 3
Canadian Allocation
Various Co-Channel
WWJ-DT Detroit, MI
Facility ID 72123
Ch. 44 345 kW 323 m

prepared for
CBS Broadcasting Inc.

January, 2008



Proposed WWJ-DT
46.2 dBμ F(50,10)
With Receive Antenna Discrimination
30.2 dBμ F(50,10)
No Receive Antenna Discrimination

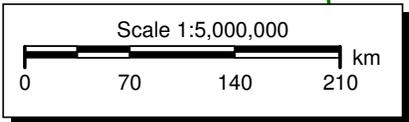


Figure 4
Canadian Allocation
Sarnia - Oil Springs, Ontario
WWJ-DT Detroit, MI
Facility ID 72123
Ch. 44 345 kW 323 m

prepared for
CBS Broadcasting Inc.

January, 2008

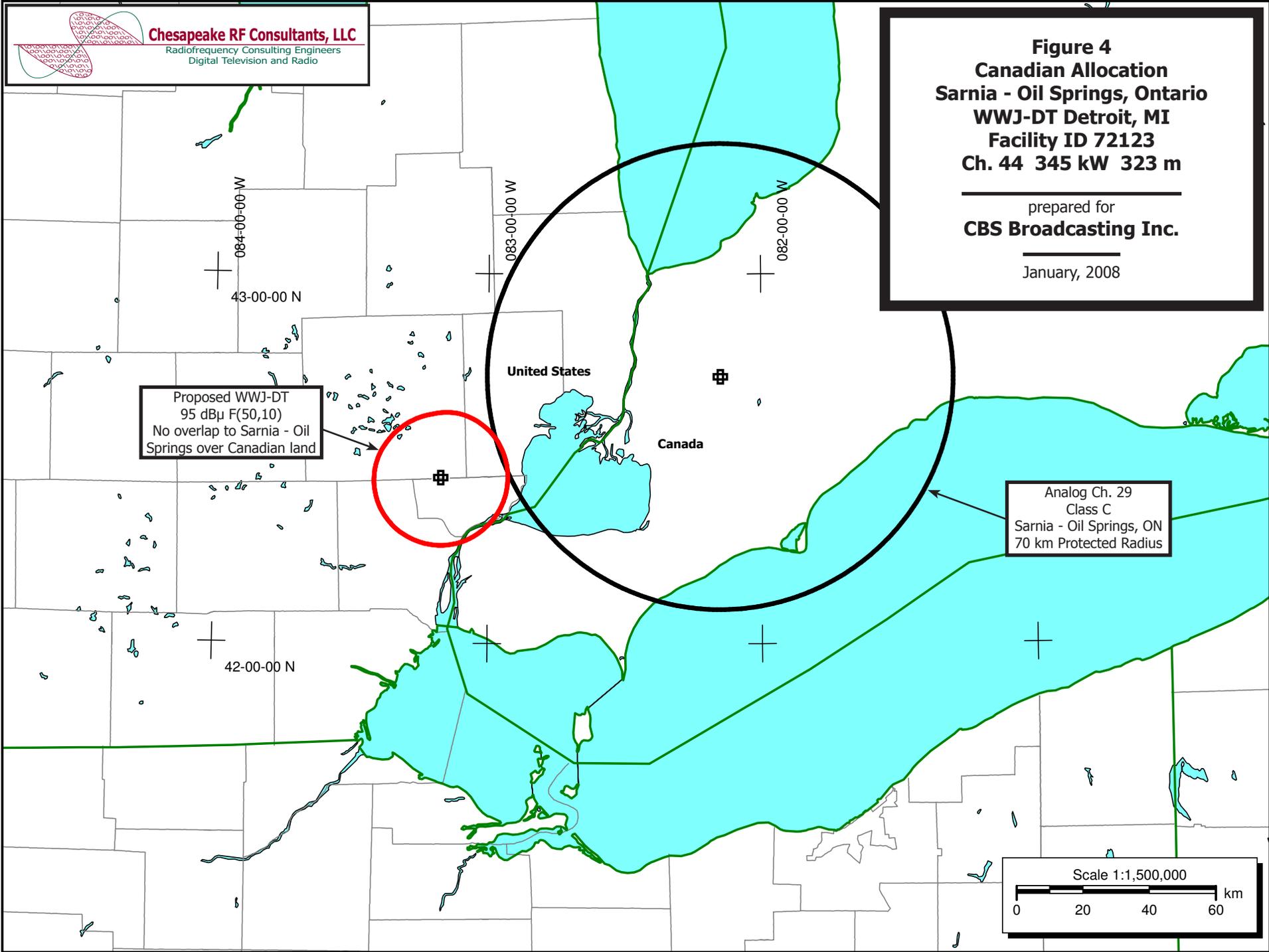


Figure 5
Canadian Allocation
Sarnia, Ontario
WWJ-DT Detroit, MI
Facility ID 72123
Ch. 44 345 kW 323 m

prepared for
CBS Broadcasting Inc.

January, 2008

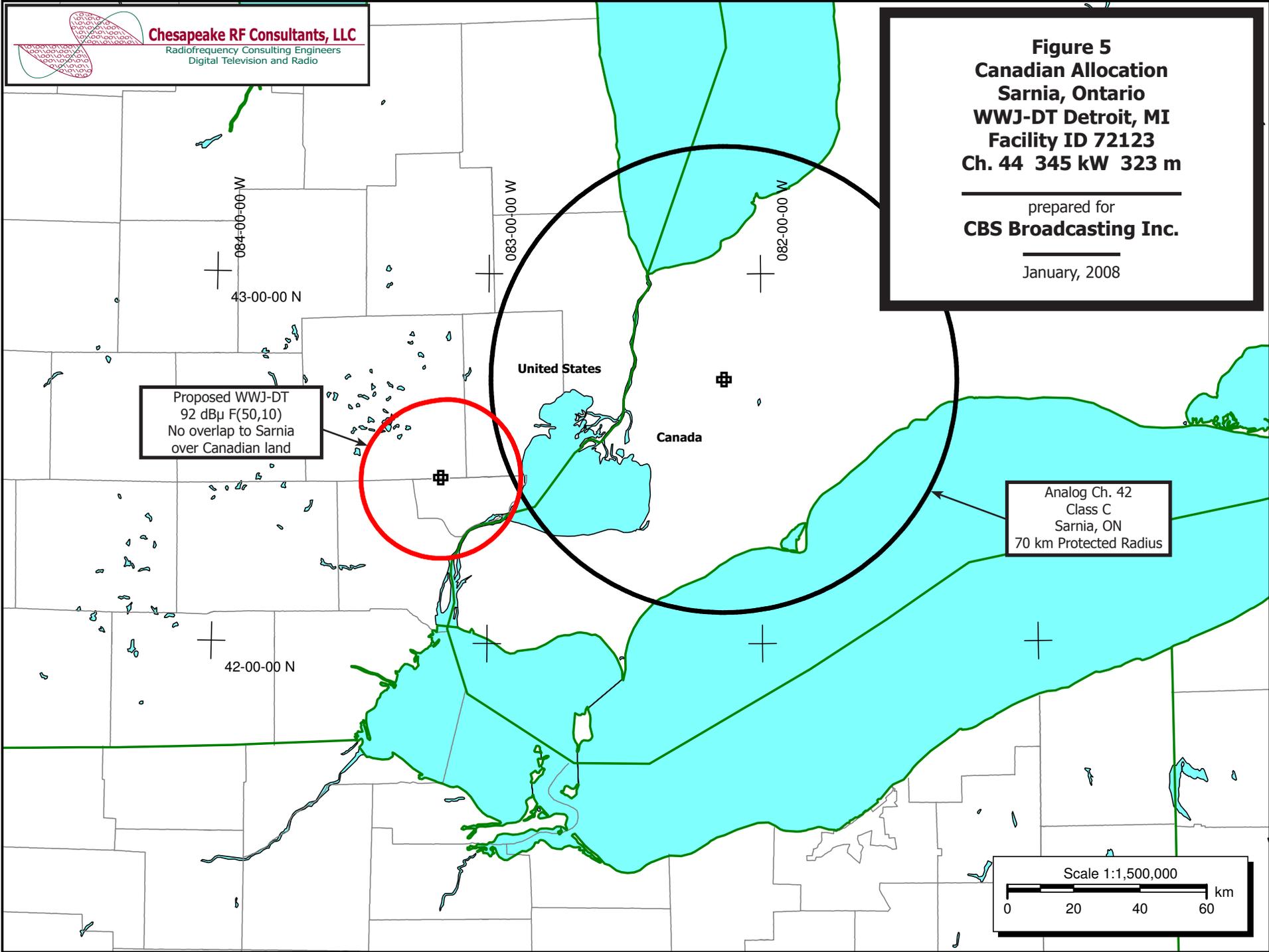
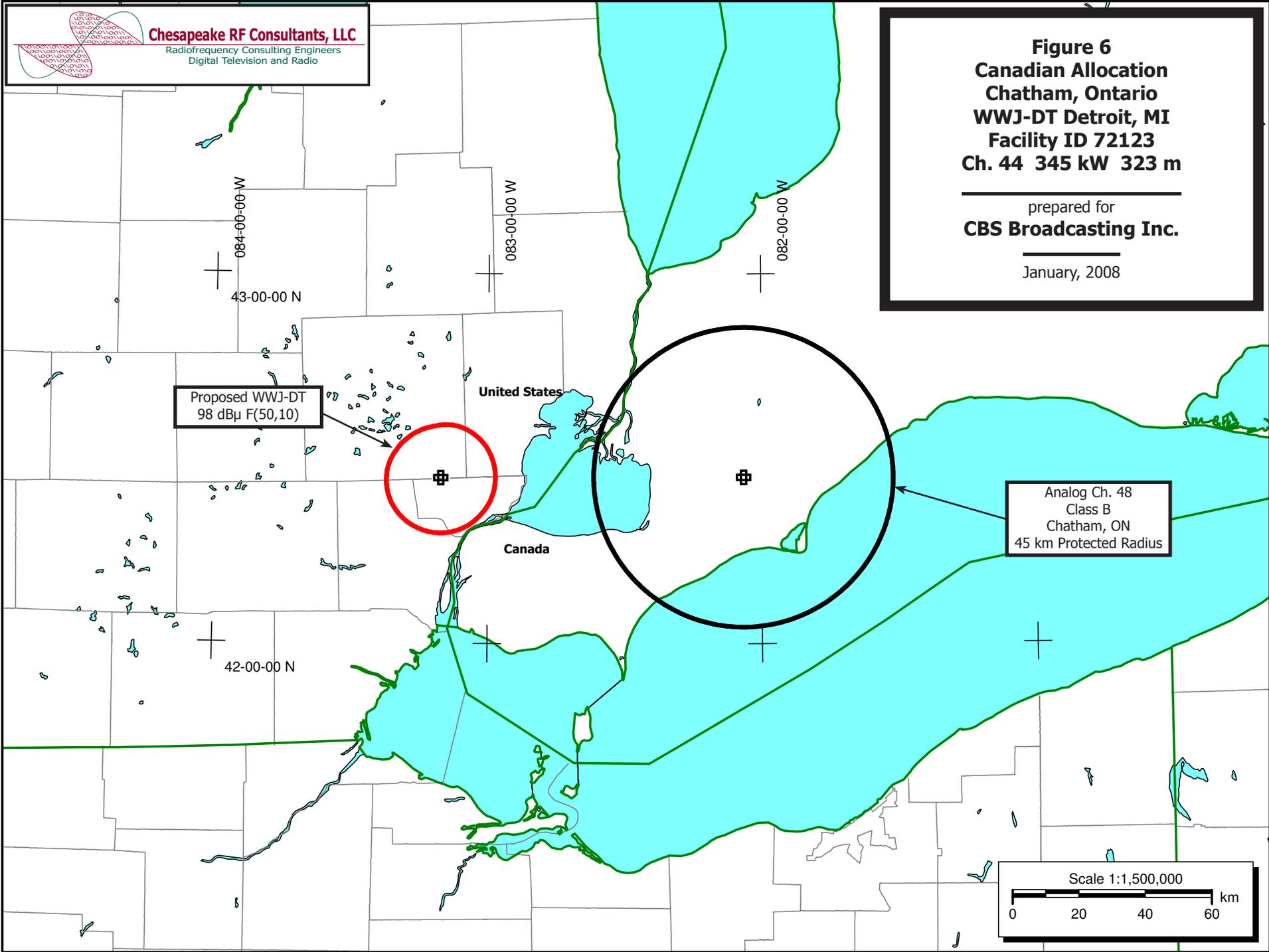


Figure 6
Canadian Allocation
Chatham, Ontario
WWJ-DT Detroit, MI
Facility ID 72123
Ch. 44 345 kW 323 m

prepared for
CBS Broadcasting Inc.

January, 2008



SECTION III-D - DTV ENGINEERING DATA	
Complete Questions 1-5 of the Certification Checklist and provide all data and information for the proposed facility, as requested in Technical Specifications, Items 1-13.	
<p>Certification Checklist: A correct answer of "Yes" to all of the questions below will ensure an expeditious grant of a construction permit. However, if the proposed facility is located within the Canadian or Mexican borders, coordination of the proposal under the appropriate treaties may be required prior to grant of the application. An answer of "No" will require additional evaluation of the applicable information in this form before a construction permit can be granted.</p>	
1. The proposed DTV facility complies with 47 C.F.R. Section 73.622 in the following respects:	
(a) It will operate on the DTV channel for this station as established in 47 C.F.R. Section 73.622.	<input checked="" type="radio"/> Yes <input type="radio"/> No
(b) It will operate from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this location as established in 47 C.F.R. Section 73.622.	<input checked="" type="radio"/> Yes <input type="radio"/> No
(c) It will operate with an effective radiated power (ERP) and antenna height above average terrain (HAAT) that do not exceed the DTV reference ERP and HAAT for this station as established in 47 C.F.R. Section 73.622.	<input type="radio"/> Yes <input checked="" type="radio"/> No
2. The proposed facility will not have a significant environmental impact, including exposure of workers or the general public to levels of RF radiation exceeding the applicable health and safety guidelines, and therefore will not come within 47 C.F.R. Section 1.1307. Applicant must submit the Exhibit called for in Item 13.	<input checked="" type="radio"/> Yes <input type="radio"/> No
3. Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community.	<input checked="" type="radio"/> Yes <input type="radio"/> No
4. The requirements of 47 C.F.R. Section 73.1030 regarding notification to radio astronomy installations, radio receiving installations and FCC monitoring stations have either been satisfied or are not applicable.	<input checked="" type="radio"/> Yes <input type="radio"/> No
5. The antenna structure to be used by this facility has been registered by the Commission and will not require registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely effect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7.	<input checked="" type="radio"/> Yes <input type="radio"/> No

SECTION III-D - DTV Engineering	
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:	DTV 44 Analog TV, if any 62
2. Zone:	<input checked="" type="radio"/> I <input type="radio"/> II <input type="radio"/> III
3. Antenna Location Coordinates: (NAD 27)	Latitude: Degrees 42 Minutes 26 Seconds 53 <input checked="" type="radio"/> North <input type="radio"/> South Longitude: Degrees 83 Minutes 10 Seconds 23 <input checked="" type="radio"/> West <input type="radio"/> East
4. Antenna Structure Registration Number: 1003429	<input type="checkbox"/> Not Applicable <input type="checkbox"/> Notification filed with FAA
5. Antenna Location Site Elevation Above Mean Sea Level:	201.8 meters
6. Overall Tower Height Above Ground Level:	331.3 meters
7. Height of Radiation Center Above Ground Level:	321 meters
8. Height of Radiation Center Above Average Terrain :	323 meters
9. Maximum Effective Radiated Power :	345 kW
10. Antenna Specifications:	<p>a. Manufacturer DIE Model TFU-18GTH-R04</p> <p>b. Electrical Beam Tilt: 0.75 degrees <input type="checkbox"/> Not Applicable</p> <p>c. Mechanical Beam Tilt: degrees toward azimuth degrees True <input checked="" type="checkbox"/> Not Applicable</p>

Attach as an exhibit all data specified in 47 C.F.R. Section 73.685. [EXHIBIT 42]

d. Polarization:
 Horizontal Circular Elliptical

e. Directional Antenna Relative Field Values: Not applicable (Nondirectional)

[For a composite directional (not off-the-shelf) antenna, press the following button to fill in the relative field values subform.]
 [Relative Field Values]

If a directional antenna is proposed, the requirements of 47 C.F.R. Sections 73.625(c) must be satisfied. **Exhibit required.** [Exhibit 43]

11. Does the proposed facility satisfy the interference protection provisions of 47 C.F.R. Section 73.623(a)? (Applicable only if **Certification Checklist** items 1(a), (b), or (c) are answered "No".) Yes No

[Exhibit 44]

If No, attach as an Exhibit justification therefore, including a summary of any previously granted waivers.

12. If the proposed facility will not satisfy the coverage requirement of 47 C.F.R. Section 73.625, attach as an Exhibit justification therefore. (Applicable only if **Certification Checklist** item 3 is answered "No".) [Exhibit 45]

13. **Environmental Protection Act. Submit in an Exhibit** the following: [Exhibit 46]

If **Certification Checklist** Item 2 is answered "Yes," a brief explanation of why an Environmental Assessment is not required. Also describe in the Exhibit the steps that will be taken to limit RF radiation exposure to the public and to persons authorized access to the tower site.

By checking "Yes" to **Certification Checklist** Item 2, 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.

If **Certification Checklist** Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R Section 1.1311.

PREPARERS CERTIFICATION ON SECTION III 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 JOSEPH M. DAVIS, P.E.	Relationship to Applicant (e.g., Consulting Engineer) CONSULTING ENGINEER	
Signature	Date 01/30/2008	
Mailing Address CHESAPEAKE RF CONSULTANTS, LLC 11993 KAHNS ROAD		
City MANASSAS	State or Country (if foreign address) VA	Zip Code 20112 -
Telephone Number (include area code) 7036509600	E-Mail Address (if available) JOSEPH.DAVIS@RF-CONSULTANTS.COM	

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).