

DELAWDER COMMUNICATIONS, INC.

2121 Eisenhower Avenue, Suite 200

Alexandria, Virginia 22314

(703) 299-9222

ENGINEERING REPORT

Cooperative TV Association of Southern Minnesota

St. James, MN (Channel 32+ Minor Modification)

EXHIBIT 6

LPTV MINOR MODIFICATION – INTERFERENCE STUDIES

I. Introduction

1. Cooperative TV Association of Southern Minnesota (“CTV”) is the licensee of K32GX, St. James, MN, channel 32(+). By this minor change modification, CTV proposes to replace its current antenna with a Kathrein 771-304 omnidirectional antenna and to relocate by less than 0.3 kilometers to the top of an existing 1000-foot tower. The radiation centerline height and ERP are also being changed by this proposal. The following changes are being proposed by this modification application:

	<u>As Authorized</u>	<u>as Modified</u>
Latitude (NAD 27):	N44° 06' 28"	N44° 06' 25"
Longitude (NAD 27):	W94° 35' 55"	W94° 35' 44"
Ground Elevation:	314.6 meters AMSL	317 meters AMSL
Radiation Center Hgt:	167 meters AGL	299 meters AGL
Overall Height:	186.5 meters AGL	303.3 meters AGL
Antenna Make/Model:	MCI 955112	Kathrein 771-304
ERP (max):	0.100 kW	0.040 kW

2. No other changes are proposed. Interference studies are provided below to demonstrate adequate protection to all known LPTV (TV translator and TV booster) stations, analog TV stations and digital TV stations. Pursuant to 47 C.F.R. Section 73.3572(a)(4)(iv)(A), because the authorized K32GX transmitter site is located within 265 kilometers of co-channel DTV stations WCCO-DT (Minneapolis, MN) and KELO-DT (Sioux Falls, SD), the changes herein proposed qualify as minor changes and this is not considered a major change modification.

3. All terrain studies use USGS/DMA three arc-second data. All population information in this application are taken from year 2000 US Census Data.

4. Attached as Table 1 is a Dataworld TV Spacing Study for Channel 32(+). The Dataworld Study was conducted from a reference site at the new transmitter

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location. Protection to the following stations has caused design constraints to the proposed Channel 32(+) transmit facility:

- a. WCCO-DT, Minneapolis, MN, licensed DTV Channel 32d;
- b. KELO-DT, Sioux Falls, SD, licensed DTV Channel 321d.

5. A discussion and/or a detailed interference study is included for each station, listed above. All other stations listed on Table 1 are either too far away to require a detailed study (and are obviously protected), or do not require protection pursuant to the FCC Rules. Tables 2A and 2B, attached, include the proposed service and interference contour distances for the proposed facility.

6. The use of frequency offset is required, and is made in order to add protection to any nearby analog co-channel station. The applicant will maintain the requested offset per 47 C.F.R. Section 74.761 by use of a precision oscillator supplied by the transmitter manufacturer.

II. Interference Studies

Regarding WCCO-DT, Minneapolis, MN, Channel 32d

7. In accordance with 47 C.F.R. Section 74.706(d)(1), a co-channel DTV UHF station is protected to a C/I ratio of 21 dB. As demonstrated by Figure 1A, attached, the 20 dBu (F50,10) interference contour for the proposed facility will overlap with the Grade B Service Contour of WCCO-TV (which is used as the noise-limited service contour of WCCO-DT). (Figure 1B is a tabulation of the WCCO-DT service contour.)

8. Using the service and interference contours, interference is predicted to result; however, the FCC allows for the use of the Longley-Rice point-to-point radio propagation model, version 1.2.2 (hereafter "Longley-Rice") in order to demonstrate that interference will not be caused to a DTV station. (A description of the allowed use of Longley-Rice {as stated by the FCC}, and a description of the Longley-Rice studies

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included with this application, are made in Section III, below.) Using Longley-Rice, as demonstrated by Figure 1C, co-channel interference to WCCO-DT from the proposed facility is determined as follows:

Total Population within WCCO-DT Noise-Limited Service Contour: 3,542,318
Total Interference Population within WCCO-DT NL Service Contour: 12,049
Percent Interference Population within WCCO-DT NL Service Contour: 0.36%

As shown above, using Longley-Rice, the predicted amount of interference caused to WCCO-DT is below the *de minimus* interference standard allowed to DTV stations.

Regarding KELO-DT, Sioux Falls, SD, Channel 32d

9. In accordance with 47 C.F.R. Section 74.706(d)(1), a co-channel DTV UHF station is protected to a C/I ratio of 21 dB. As demonstrated by Figure 2A, attached, the 20 dBu (F50,10) interference contour for the proposed facility will overlap with the 41 dBu (F50,90) noise-limited service contour of KELO-DT. (Figure 2B is a tabulation of the KELO-DT service contour.)

10. Using the service and interference contours, interference is predicted to result; however, the FCC allows for the use of Longley-Rice in order to demonstrate that interference will not be caused to a DTV station. Using Longley-Rice, as demonstrated by Figure 2C, co-channel interference to KELO-DT from the proposed facility is determined as follows:

Total Population within KELO-DT Noise-Limited Service Contour: 565,419
Total Interference Population within KELO-DT NL Service Contour: 2,744
Percent Interference Population within KELO-DT NL Service Contour: 0.49%

As shown above, using Longley-Rice, the predicted amount of interference caused to KELO-DT is below the *de minimus* interference standard allowed to DTV stations. (See paragraph 8, above, and Section III, below, for a discussion of Longley-Rice.)

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III. DESCRIPTION OF LONGLEY-RICE STUDIES

11. 47 C.F.R. Sections 74.705(e), and 74.707(e) allow for the use of Longley-Rice in order to demonstrate protection to TV broadcast analog stations and LPTV stations, respectively. Furthermore, Paragraph 105 of the FCC's *In the Matter of Amendment of Parts 73 and 74 of the Commission's Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations - Report and Order (FCC 04-220, released September 30, 2004)* states that the use of Longley-Rice is permitted as an optional showing for processing analog LPTV (and TV translator and TV booster) stations to all protected TV stations (primary, secondary, digital or analog) without requiring a waiver. (Previously, a waiver request was necessary in order to demonstrate protection using the Longley-Rice Methodology.)

12. EDX Engineering, Inc.'s computer software program MSITE™ includes the Longley-Rice version 1.2.2 model; and the MSITE™ program is used to conduct the Longley-Rice studies which are included with this application. With the exception of not being able to identify and use population centroids, the procedures and parameters specified by the FCC's OET Bulletin No. 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference* (dated July 2, 1997) are used by the MSITE™ program. In order to compensate for the programs inability to choose population centroids, the grid size for each study has been reduced from two kilometer spacing (the spacing used by the FCC), to one kilometer or less spacing. (For protection to LPTV, TV translator and TV booster stations, the grid size used is 0.5 kilometer or less.) With the reduced grid spacing, the applicant can confidently conclude that a study using population centroids will also demonstrate protection from interference.

13. The software is limited to a study distance of 399 kilometers; therefore, in some instances, the study is truncated at 399 kilometers from the proposed transmitter site. Interference is not predicted to result beyond 399 kilometers from the proposed LPTV transmitter site. Furthermore, any contour overlap area is located completely within 399 kilometers; and, therefore, the contour overlap area is completely studied.

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14. For each Longley-Rice study, the dipole factor adjustment specified by OET Bulletin No. 69 is applied to both the point-to-point evaluation and the contour distances. Also, USGS three arc-second terrain data is used. The product of each study is a map which identifies those examined points of the study-grid (within the protected station's applicable service, Grade B or noise-limited contour) which are above or below the C/I protection requirement. (For the included studies, all C/I results are above the required protection standards.)

15. As allowed by OET Bulletin No. 69, only those grid points which are predicted to receive a field strength from the desired station that is above the threshold for reception are considered. The MSITETM output exhibits of this application show the threshold of reception as the corresponding minimum allowed receive power.

16. As with most complicated computer propagation models, much of the underlying data of each study cannot be easily generated or reported in text form. To the extent possible, if requested by the FCC, additional data regarding the Longley-Rice studies will be provided.

Delawder Communications, Inc.
Alexandria, VA

Table 1, Page 1 of 1
Monday, April 04, 2005

Dataworld LPTV/TV Translator Interference Study

Title: St James, MN

Channel: 32 Offset: Unspecified (680-686 MHz) Analog
Database: FCC 4/1/2005 12:00:00 AM

Latitude: N 44° 06' 25.0"
Longitude: W 94° 35' 44.0"
Safety Zone: 32.0 km

Call	Auth	Licensee name	Chan	HAAT(m)	ERP	Latitude	Br-to	Dist	Req
City of License		St	FCC File Number	Zone	HAMSL(m)	Longitude	-from	(km)	(km)
NEW FAIRMONT	APP	THREE ANGELS BROADCASTING NETWORK	17 +		0.9	N 43° 40' 03.0"	166.3	50.26	
		MN BNPTTL-20000830BJO		406.2		W 94° 26' 50.0"	346.4		
DA: ANT ACS4E @ 270.0°; Calculated HAAT: 50 m									
DeLawder Note: Too far away; No interference study is required									
K17BV	LIC	REDWOOD TV IMPROVEMENT CORP.	17 +		0.768	N 44° 32' 59.0"	329.2	57.42	
REDWOOD FALLS		MN BLTTL-19880728IA		413.0		W 94° 58' 00.0"	148.9		
Calculated HAAT: 106 m									
DeLawder Note: Too far away; No interference study is required									
K31EF	LIC	SOUTH CENTRAL ELECTRIC ASSOCIATI	31 +		1.56	N 43° 35' 09.0"	137.1	78.88	
FROST		MN BLTTL-19950314IG		434.0		W 93° 55' 46.0"	317.6		
Calculated HAAT: 87 m									
DeLawder Note: Too far away; No interference study is required									
K32GX	CP	COOPERATIVE TELEVISION ASSOCIATI	32 +		0.1	N 44° 06' 28.0"	290.8	0.262	
ST. JAMES		MN BNPTTL-20000821AAM		481.6		W 94° 35' 55.0"	110.8		
Calculated HAAT: 169 m									
DeLawder Note: Applicant; Station that's being modified									
K32DR	LIC	MINNESOTA VALLEY TV IMPROVEMENT	32 -		1.45	N 44° 48' 17.0"	315.1	110.2	
GRANITE FALLS		MN BLTTL-19940517JE		404.0		W 95° 34' 49.0"	134.4		
Calculated HAAT: 91 m									
DeLawder Note: Too far away; No interference study is required									
WCCO-TV	LIC	CBS BROADCASTING INC.	32	432.0	1000	N 45° 03' 44.0"	46.8	157.0	
MINNEAPOLIS		MN BLCDT-20010921ABB	II	711.0		W 93° 08' 21.0"	227.9		
Digital channel									
DeLawder Note: Attached study shows adequate protection; See Engineering Statement									
KELO-TV	LIC	YOUNG BROADCASTING OF SIOUX FALL	32	589.0	869	N 43° 31' 07.0"	247.9	169.2	
SIOUX FALLS		SD BLCDT-20030417AAE	II	1019.0		W 96° 32' 05.0"	66.5		
Digital channelDA: DIE TUC-05-16/80H-1-B @ 0.0°									
DeLawder Note: Attached study shows adequate protection; See Engineering Statement									
KRIN	LIC	IOWA PUBLIC BROADCASTING BOARD	*32 -	579.0	5000	N 42° 18' 59.0"	131.0	298.4	
WATERLOO		IA BLET-19860923KQ	II	857.0		W 91° 51' 31.0"	312.8		
DA: RCA ODDKRIN @ 0.0°									
DeLawder Note: Too far away; No interference study is required									
K32DR	CP	MINNESOTA VALLEY TV IMPROVEMENT	33 o		1.44	N 44° 48' 17.0"	315.1	110.2	
GRANITE FALLS		MN BPTTL-20020926ABV		404.1		W 95° 34' 49.0"	134.4		
Calculated HAAT: 91 m									
DeLawder Note: Too far away; No interference study is required									
KAAL	CP	KAAL-TV, LLC	33	295.0	1000	N 43° 37' 42.0"	114.2	127.5	
AUSTIN		MN BPCDT-19991022ABU	II	671.0		W 93° 09' 12.0"	295.2		
Digital channel									
DeLawder Note: Too far away; No interference study is required									

>> End of channel 32 study <<

TABLE 2A - ST. JAMES, MN F50,50 CONTOURS

DATE: April 19, 2005

DISTANCES TO CONTOURS (Kilometers):

Antenna COR elevation (AMSL): 616 mtrs Average HAAT: 303 mtrs

Frequency: 581.0000 MHz

Coordinates: N 44 6 25.00 W 94 35 44.00

F(50,50) Curves Number of Contours: 5 2

AZ (degs)	HAAT (m)	ERPd (kW)	CONTOUR LEVELS (dBu):				
			89.0	80.0	79.0	74.0	70.0
0.0	310	0.0398	<0.1	3.5	3.8	5.7	7.5
45.0	311	0.0398	<0.1	3.5	3.8	5.7	7.6
90.0	304	0.0398	<0.1	3.5	3.8	5.7	7.5
135.0	301	0.0398	<0.1	3.5	3.8	5.7	7.5
180.0	297	0.0398	<0.1	3.4	3.8	5.6	7.4
225.0	294	0.0398	<0.1	3.4	3.7	5.6	7.4
270.0	299	0.0398	<0.1	3.5	3.8	5.6	7.5
315.0	309	0.0398	<0.1	3.5	3.8	5.7	7.5

TABLE 2B - ST. JAMES, MN F50,10 CONTOURS

DATE: April 19, 2005

DISTANCES TO CONTOURS (Kilometers):

Antenna COR elevation (AMSL): 616 mtrs Average HAAT: 303 mtrs

Frequency: 581.0000 MHz

Coordinates: N 44 6 25.00 W 94 35 44.00

F(50,10) Curves Number of Contours: 5 2

AZ (degs)	HAAT (m)	ERPd (kW)	CONTOUR LEVELS (dBu):				
			46.0	36.0	29.0	20.0	19.0
0.0	310	0.0398	32.9	50.0	63.5	89.8	93.3
45.0	311	0.0398	32.9	50.0	63.6	89.9	93.5
90.0	304	0.0398	32.6	49.6	62.9	89.1	92.6
135.0	301	0.0398	32.5	49.5	62.7	88.9	92.4
180.0	297	0.0398	32.3	49.3	62.4	88.5	91.9
225.0	294	0.0398	32.2	49.1	62.1	88.2	91.6
270.0	299	0.0398	32.4	49.4	62.6	88.7	92.2
315.0	309	0.0398	32.8	49.9	63.4	89.7	93.2

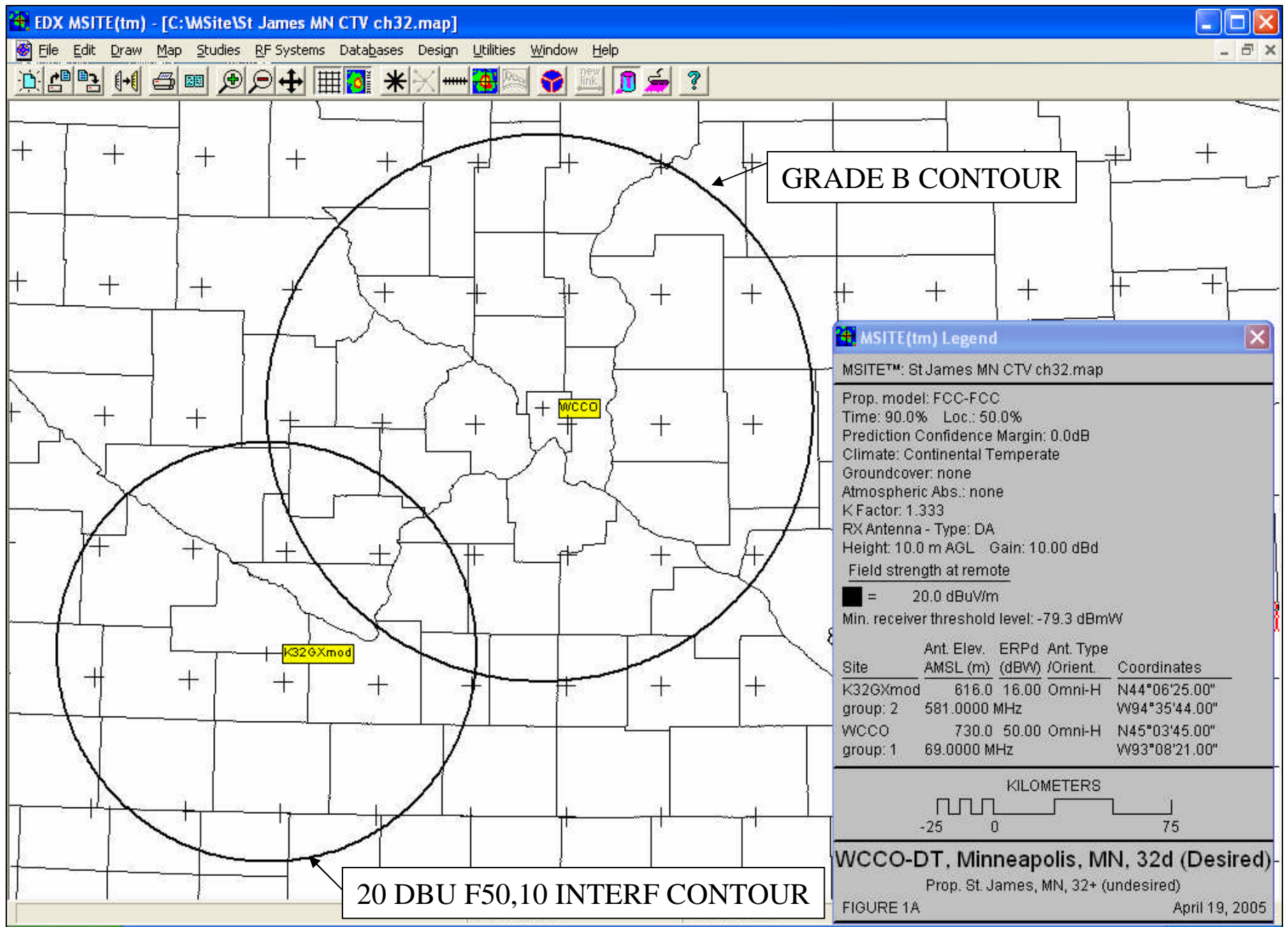


FIGURE 1B - WCCO-TV, MINNEAPOLIS, MN GRADE B CONTOUR

DATE: April 19, 2005

DISTANCES TO CONTOURS (Kilometers):

Antenna COR elevation (AMSL): 730 mtrs Average HAAT: 452 mtrs

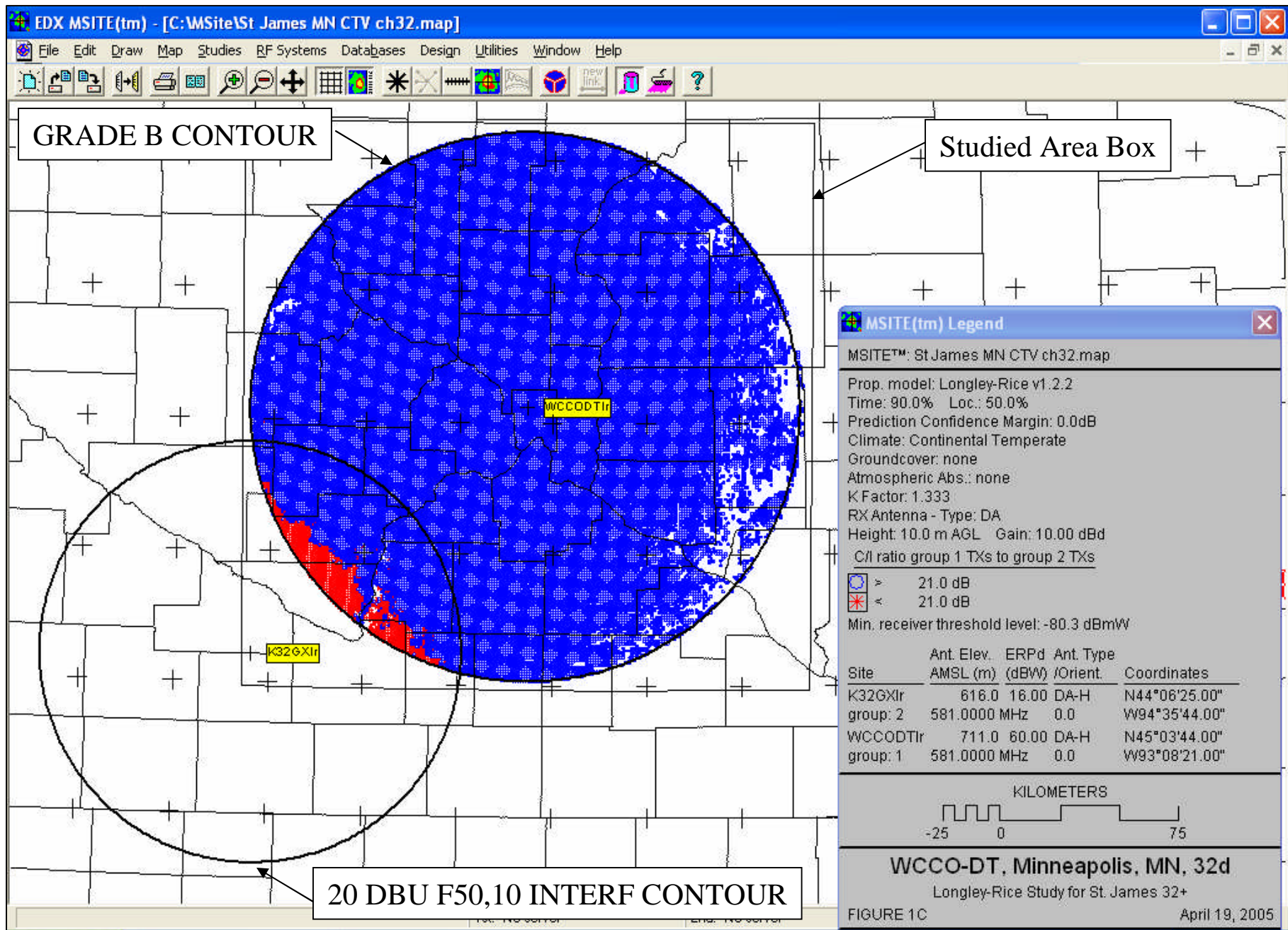
Frequency: 69.0000 MHz

Coordinates: N 45 3 45.00 W 93 8 21.00

F(50,50) Curves Number of Contours: 1 2

AZ (deg)	HAAT (m)	ERPd (kW)	CONTOUR LEVELS (dBu): 47.0
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0.0	454	100.0000	116.2
45.0	448	100.0000	115.6
90.0	441	100.0000	115.0
135.0	449	100.0000	115.8
180.0	455	100.0000	116.3
225.0	455	100.0000	116.3
270.0	460	100.0000	116.8
315.0	453	100.0000	116.1



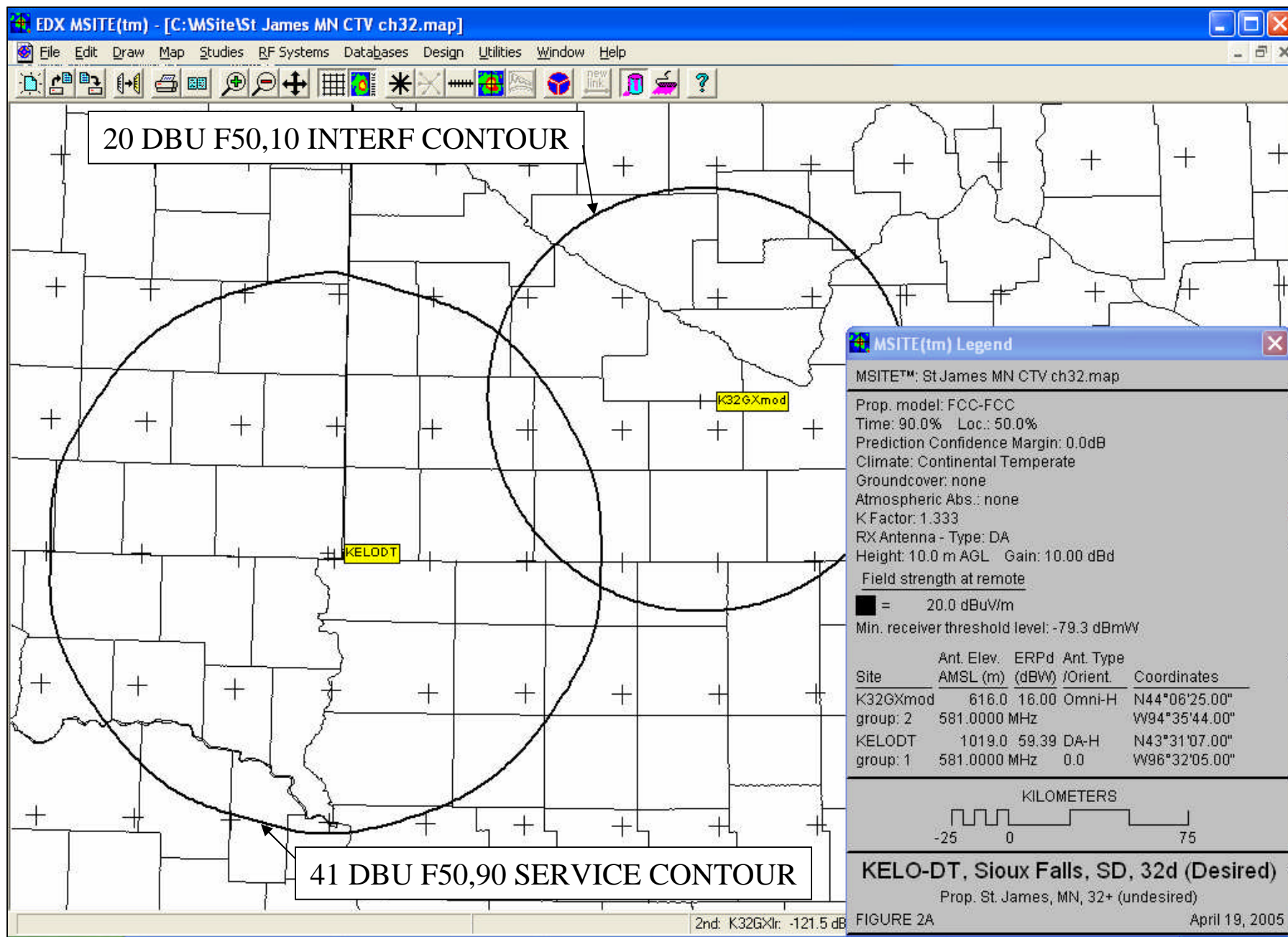


FIGURE 2B - KELO-DT, SIOUX FALLS, SD F50,90 CONTOUR

DATE: April 19, 2005

DISTANCES TO CONTOURS (Kilometers):

Antenna COR elevation (AMSL): 1019 mtrs Average HAAT: 589 mtrs

Frequency: 581.0000 MHz

Coordinates: N 43 31 7.00 W 96 32 5.00

F(50,90) Curves Number of Contours: 1 2

AZ (degs)	HAAT (m)	ERPd (kW)	CONTOUR LEVELS (dBu): 41.0
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0.0	588	848.2302	118.5
15.0	579	621.9291	115.0
30.0	588	724.3384	117.0
45.0	582	719.5861	116.5
60.0	568	679.0544	115.2
75.0	565	761.2928	116.1
90.0	573	644.1783	115.0
105.0	572	767.8136	116.6
120.0	575	662.2600	115.4
135.0	582	697.6155	116.3
150.0	588	716.4264	116.9
165.0	595	668.3428	116.6
180.0	601	769.4481	118.2
195.0	598	653.1882	116.5
210.0	602	789.1979	118.5
225.0	605	705.4232	117.6
240.0	596	716.4264	117.3
255.0	587	829.4475	118.2
270.0	581	682.1302	116.0
285.0	596	790.8550	118.2
300.0	591	669.8679	116.4
315.0	602	722.7527	117.7
330.0	605	682.1302	117.3
345.0	606	621.9291	116.5

