

**Comprehensive Technical Statement**  
 In support of  
**Murphy Communications Institute, Inc.**  
 Application for New Non-Commercial Educational FM Station  
 88.3 mHz, Channel 202C1  
 Bullhead City, AZ

**Mexican Concurrence Required**

**Waiver of 73.525 Requested**

**Introduction**

Murphy Communications Institute, Inc. proposes to construct a new Non-Commercial Educational (NCE) FM station to serve Bullhead City, AZ.

The proposed site is within 320km of Mexico, and Mexican concurrence is therefore required.

The proposed facility would cause objectionable interference to analog channel 6 television station KMOH-TV. Elsewhere in the instant application is a request for a waiver of 73.525. The applicant commits that, should a Construction Permit be granted as a result of the application, it will not commence program tests until after the actual shutdown of Channel 6.

**Allocation Study**

The following table lists all FM conflicts that do not exceed the 73.207 required spacings by at least 30km:

adj	chan	stat	Call	cy	st	city	brg	dist	erp	da	haat	req	delta	eval
1	203C2	APP	NEW	US	AZ	KINGMAN	81	42.6	0.5	N	879	158	-115.4	SHORT
1	203A	APP	NEW	US	AZ	KINGMAN	81	42.6	0.5	N	879	133	-90.4	SHORT
1	201C2	LIC	KCEP	US	NV	LAS VEGAS	332	122.9	10	N	364	158	-35.1	SHORT
1	203C0	CP	KEKL	US	NV	MESQUITE	354	175.1	30	Y	563	196	-20.9	SHORT
1	203C3	APP	KERU-FM	US	CA	BLYTHE	186	143.0	7	N	87	144	-1.0	SHORT
0	202C1	LIC	KPHF	US	AZ	PHOENIX	127	263.1	22.5	N	297	245	18.1	CLEAR
0	202C1	LIC	KNAI	US	AZ	PHOENIX	127	263.1	22.5	N	304	245	18.1	CLEAR
1	203C2	LIC	KEKL	US	NV	MESQUITE	356	183.6	20.5	N	149	158	25.6	CLEAR
1	203A	LIC	KERU-FM	US	CA	BLYTHE	188	159.1	0.1	N	-17	133	26.1	CLEAR

The first two records are existing NCE applications that must be amended in the current filing window. ***Protection to these applications is not provided by the instant application, and detailed interference studies were not performed for these conflicts.***

All other conflicts are either co-channel or first adjacent. No second or third adjacent conflicts exist.

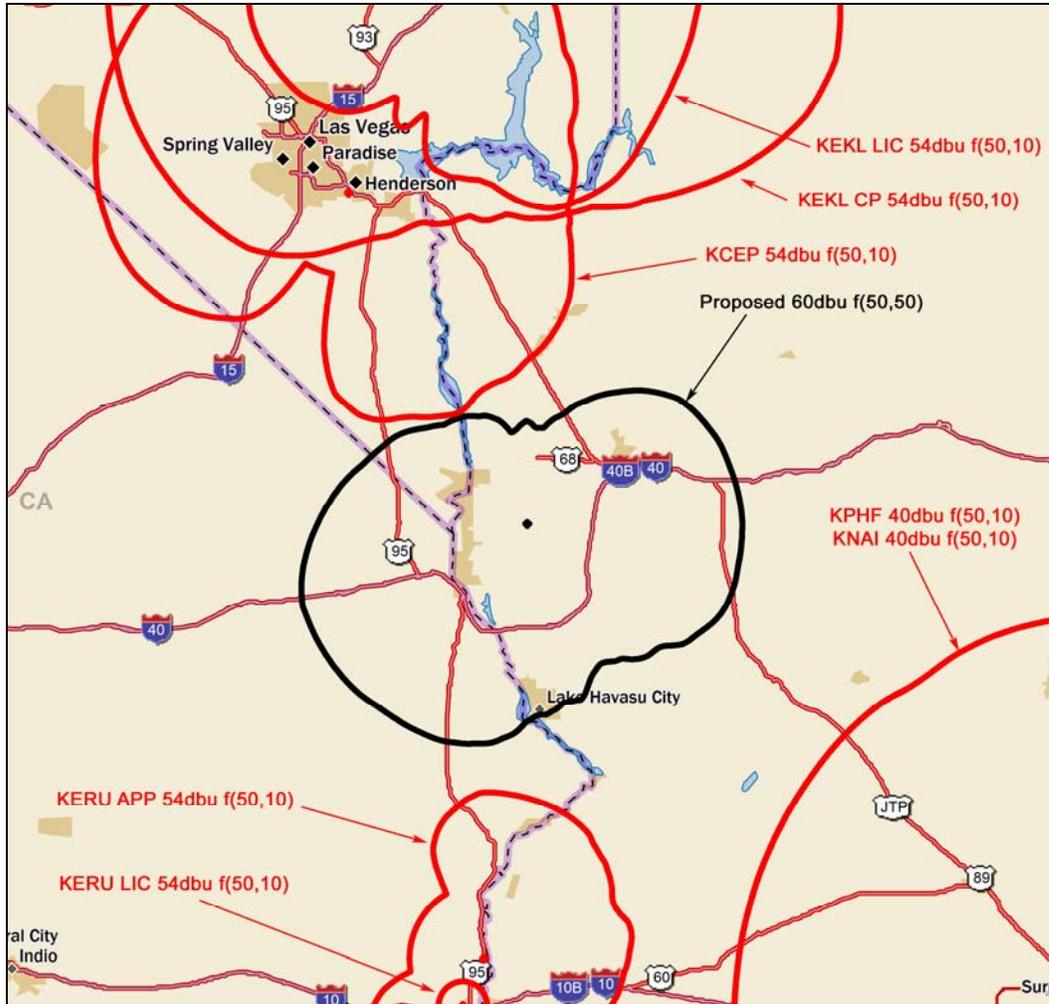
The following section provides a detailed interference-based analysis of each conflict, and shows clearly that no objectionable interference will occur.

## Detailed Interference Study

The following collection of maps and the narrative accompanying each show conclusively that no prohibited overlap will occur between the proposed facility and the working conflicts listed in the allocation study.

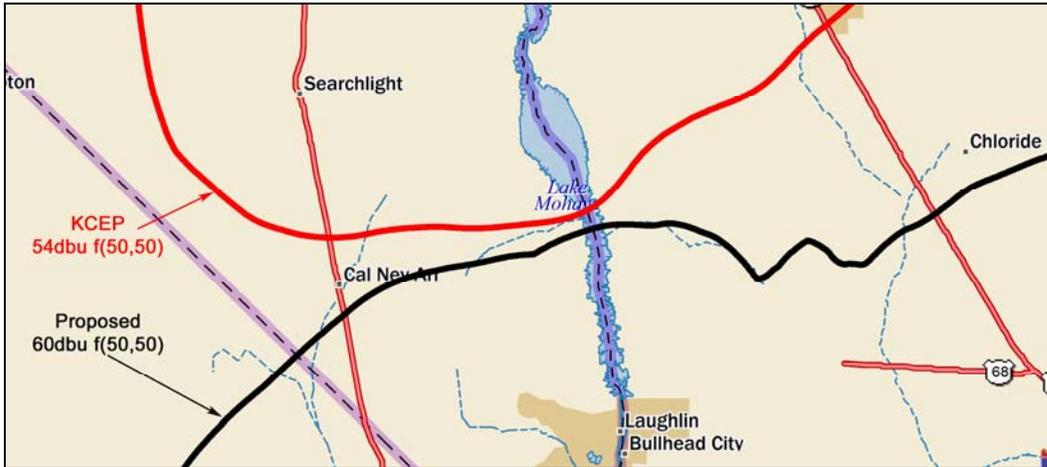
As noted above, protection is not offered to the two NCE applications for Kingman, which must be amended in the current window. Therefore, those proposals are not included in this section.

### Map 1 – Inbound Interference



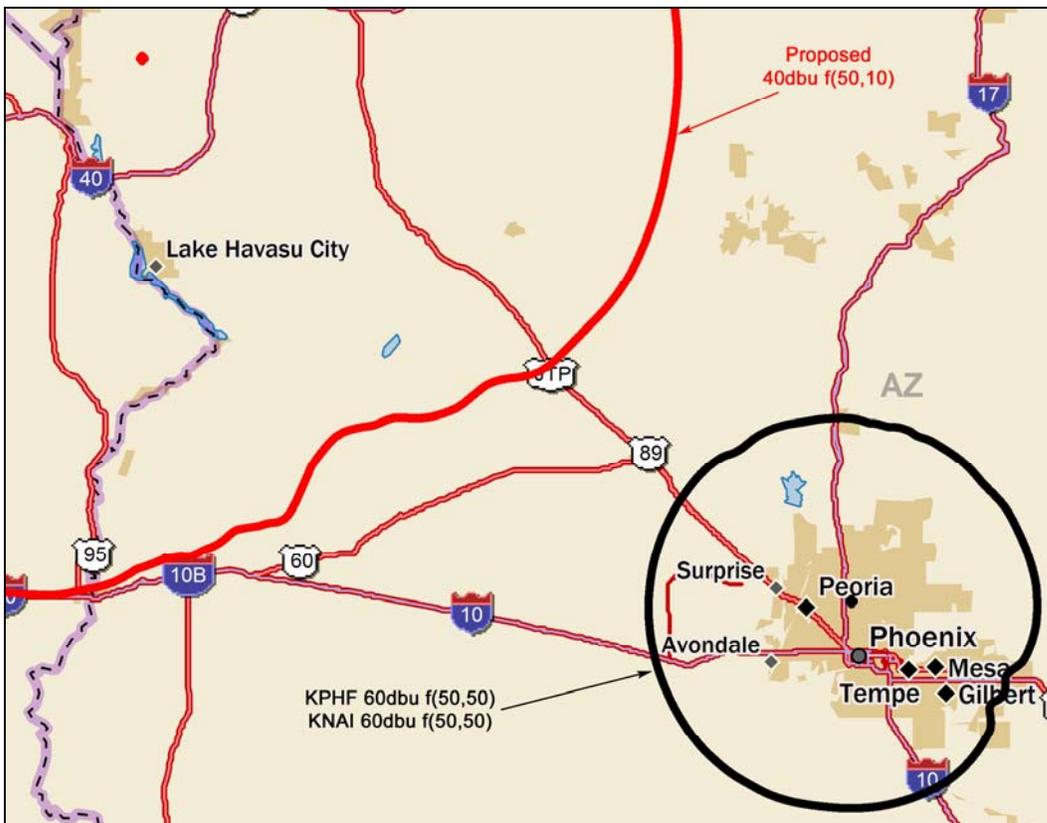
This map shows the protected contour of the proposed facility and the interfering contours of the conflicts. It is clear that all interfering contours easily clear the proposed protected contour, with the exception of KCEP, which is detailed below.

**Map 2 – Detailed Inbound Interference – KCEP**



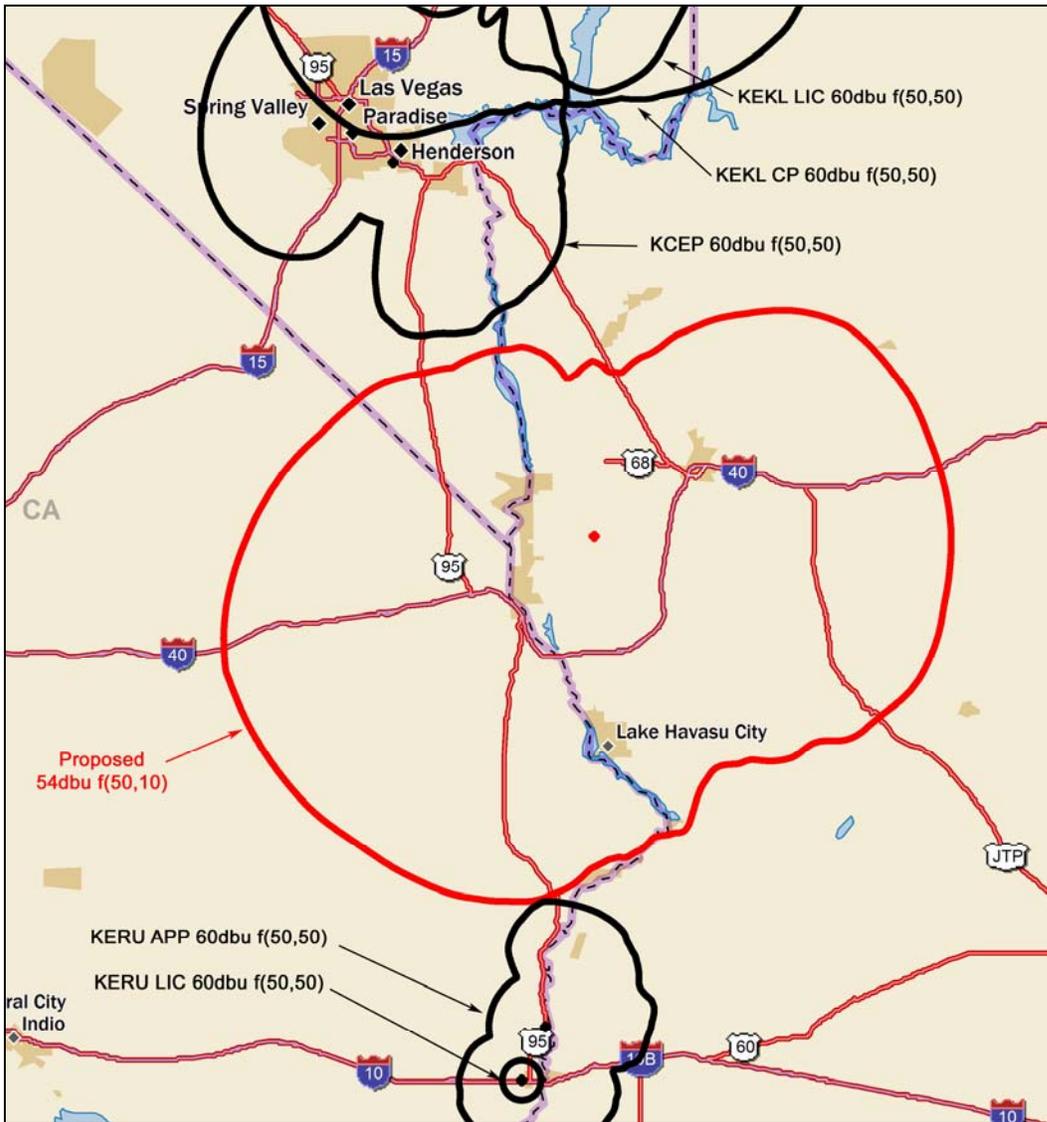
This map shows that the interfering signal from KCEP clears the protected contour of the proposal.

**Map 3 – Co-channel Outbound Interference**



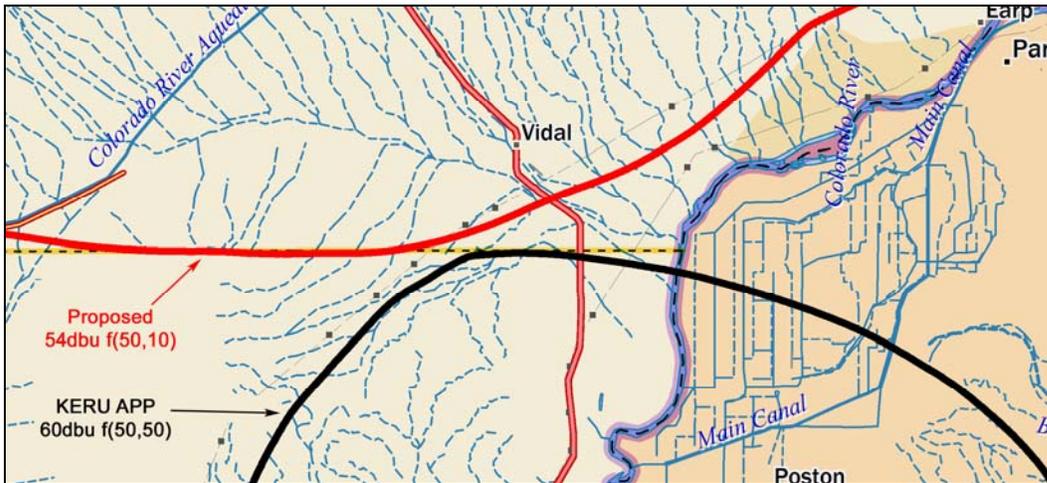
KPHF and KNAI share channel 202 in Phoenix. Their facilities are nearly identical, so while both are plotted, they appear to be superimposed. The interfering contour of the proposal clears the protected contours of KPHF and KNAI by a considerable distance.

**Map 4 – First Adjacent Outbound Interference**



The interfering contour of the proposal easily clears all protected contours with the exception of the KERU application, which is shown in detail below.

**Map 5 – Second Adjacent Outbound Interference Detail**



This close-up clearly shows that the contours do not cross.

**Channel 6 Interference**

Applicant stipulates that the instant proposal would cause objectionable interference to analog television channel 6, station KMOH. Elsewhere in the application is a request for waiver due to the impending sunset of analog television broadcasting.

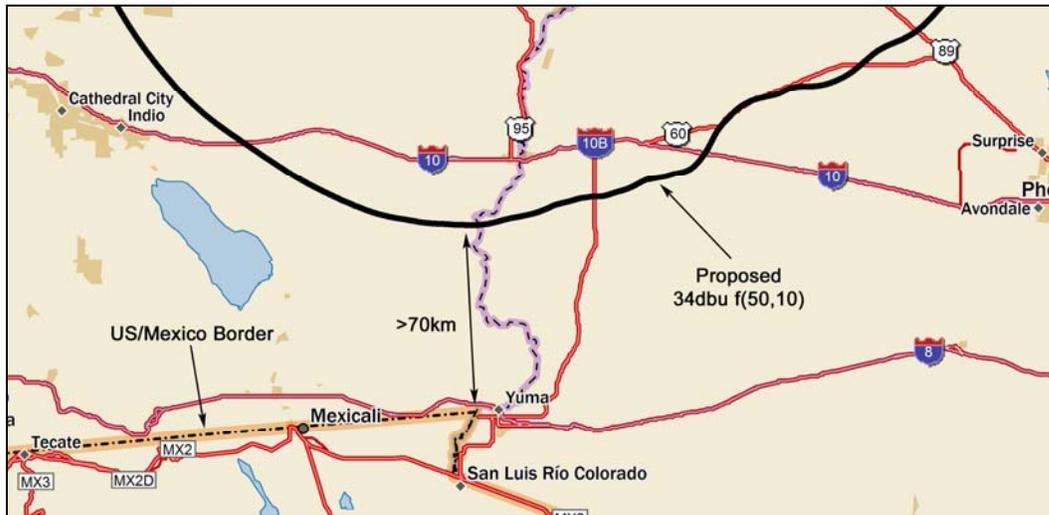
Since the application is based on the demise of channel 6 analog broadcasting and requests a waiver of 73.525, no Channel 6 interference study was done.

**Directional Antenna**

A directional antenna is proposed. The antenna has a null depth of 13.5db, which is less than the maximum limit of 15db allowed in the Rules. No ten degree increment has a change of greater than 2db.

azimuth	field	azimuth	field	azimuth	field
0	0.282	120	1.000	240	1.000
10	0.355	130	1.000	250	0.891
20	0.447	140	1.000	260	0.708
30	0.562	150	1.000	270	0.562
40	0.708	160	1.000	280	0.447
50	0.891	170	1.000	290	0.355
60	1.000	180	1.000	300	0.282
70	1.000	190	1.000	310	0.224
80	1.000	200	1.000	320	0.178
90	1.000	210	1.000	330	0.178
100	1.000	220	1.000	340	0.178
110	1.000	230	1.000	350	0.178

## International



The proposed transmitter location is 259 km from the nearest point on the US/Mexico border. Coordination with Mexico is required for all proposals within 320km of the border.

No records in Mexico are within 50km of the treaty-required distances. The proposed 34dbu f(50,10) contour falls more than 70km short of the US/Mexico border.

While this is a C1 proposal domestically, it would be coordinated with Mexico as Class C.

Although a directional antenna is proposed, there would be no reduction in radiation toward Mexico. Therefore, the proposal could be coordinated as non-directional.

### International coordination information:

Channel 201  
Frequency 88.3mHz  
Effective Radiated Power 12.5kW  
Height Above Mean Sea Level 1367m / 4485'  
Height Above Average Terrain 579m / 1900'  
Class C  
Latitude (NAD-27) 35 01 58 N  
Longitude (NAD-27) 114 21 57 W

## **Transmitter Location**

The transmitter site proposed is that of KADD (FM). KADD has a construction permit to move to a new location. While Applicant anticipates reuse of the tower and some other facilities, the application is not contingent on the relocation of KADD. Applicant commits to constructing the facility regardless of whether KADD actually relocates.

A detailed description of the transmitter site is contained in the section regarding RF Exposure below.

## **RF Exposure**

The proposed transmitter site is an antenna farm that is also used by FM stations KJJJ (17kW), KADD (2.75kW), KNKK (15.5kW), KLUK (29.5kW); television station KMOH-TV (100kW visual + 20kW aural) and its digital twin KMOH-DT (25kW); and a number of licensed UHF facilities with an aggregate ERP of 10.6kW.

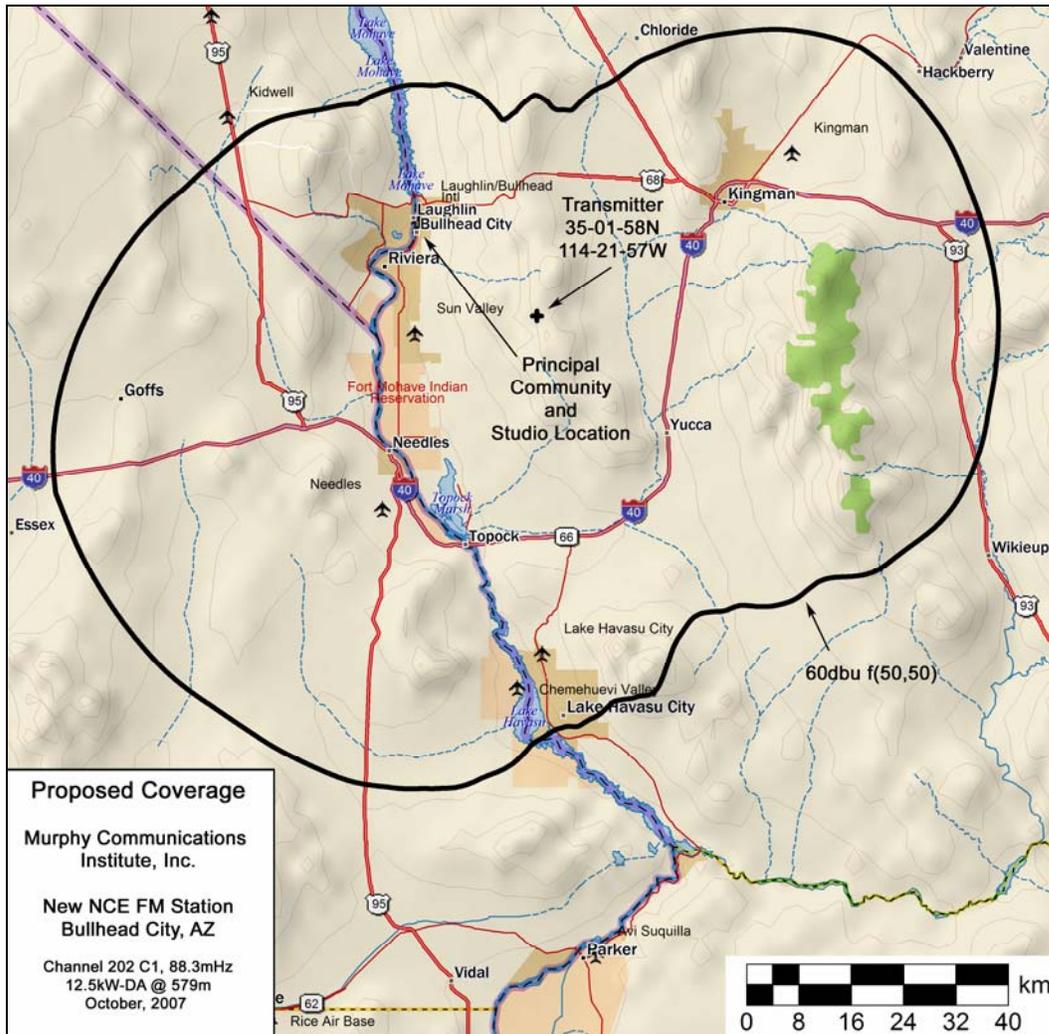
As noted above, the instant application is contingent on the demise of KMOH-TV's analog broadcast service. The proposed facility would therefore replace the 120kW total power of KMOH-TV with 25kW H+V power, resulting in a net reduction of RF exposure at the site.

The site is not accessible to the general public. There is a single access road protected by a locked gate that is equipped with warning signs.

Warning signs provide notification to authorized personnel of hazardous areas.

Applicant agrees to coordinate with other users of the site to reduce power or shut down in order to protect workers at the site.

## Population and Area Covered



**Area 12,068 km<sup>2</sup>**  
**Population 144,369**

Basis of population count and area:

The distance to the 60dbu f(50,50) signal was calculated for 3600 radials spaced evenly every 0.1 degree, and an intercept program was used to determine the coordinates from the distance and bearing. The 60dbu contour thus consists of a 3600-sided polygon. For each US Census Bureau population centroid in the area, a determination was made as to whether the centroid was located in the contour polygon. The population inside the contour is the sum of the populations of the centroids that fall within the contour.

The total area was calculated as  $\pi/3600$  times the sum of the squares of the 3600 radial distances.

## First NCE and Second NCE Service

NCE service population counts were computed as follows:

The distance to the 60dbu f(50,50) signal was calculated for 3600 radials spaced evenly every 0.1 degree, and an intercept program was used to determine the coordinates from the distance and bearing. The 60dbu contour thus consists of a 3600-sided polygon. For each US Census Bureau population centroid in the area, a determination was made as to whether the centroid was located in the contour polygon. The population inside the contour is the sum of the populations of the centroids that fall within the contour.

For each centroid, a count was made of the number of contours enclosing it, and the centroid was ranked accordingly. The centroid populations were then added together according to rank.

The following report summarizes the results:

### SKYWAVES NCE/FM POPULATION COUNT REPORT

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#### Population by current servers

110,100 people are currently served by 0 stations.  
195 people are currently served by 1 stations.  
34,074 people are currently served by 2 stations.  
0 people are currently served by 3 stations.  
0 people are currently served by four or more stations.

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#### ERROR CHECK

144,369 counted by centroid  
144,369 overall population  
0 error count

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#### SUMMARY

110,100 people would receive a FIRST NCE/FM service.  
195 people would receive a SECOND NCE/FM service.  
110,295 people would receive a FIRST OR SECOND NCE/FM service.

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#### SERVERS

KAIH 207 AZ LAKE HAVASU CITY  
KNLB 216 AZ LAKE HAVASU CITY

The total population of the proposed service area is 144,369.

The population that would receive a first NCE service is 110,100, or 76% of the total population, and greater than 2,000. Applicant therefore answers YES to Section III, question 1.

The population that would receive a second NCE service is 195. That is less than 2,000, and therefore applicant answers NO to Section III question 2.

**Conclusion**

Applicant stipulates that protection is not afforded to the Kingman applications or to KMOH-TV on channel 6.

The instant application would provide a first NCE service to over 110,000 people. It would cause no objectionable interference to any existing FM license or construction permit, and it would cause no objectionable interference to the viable application of KERU.