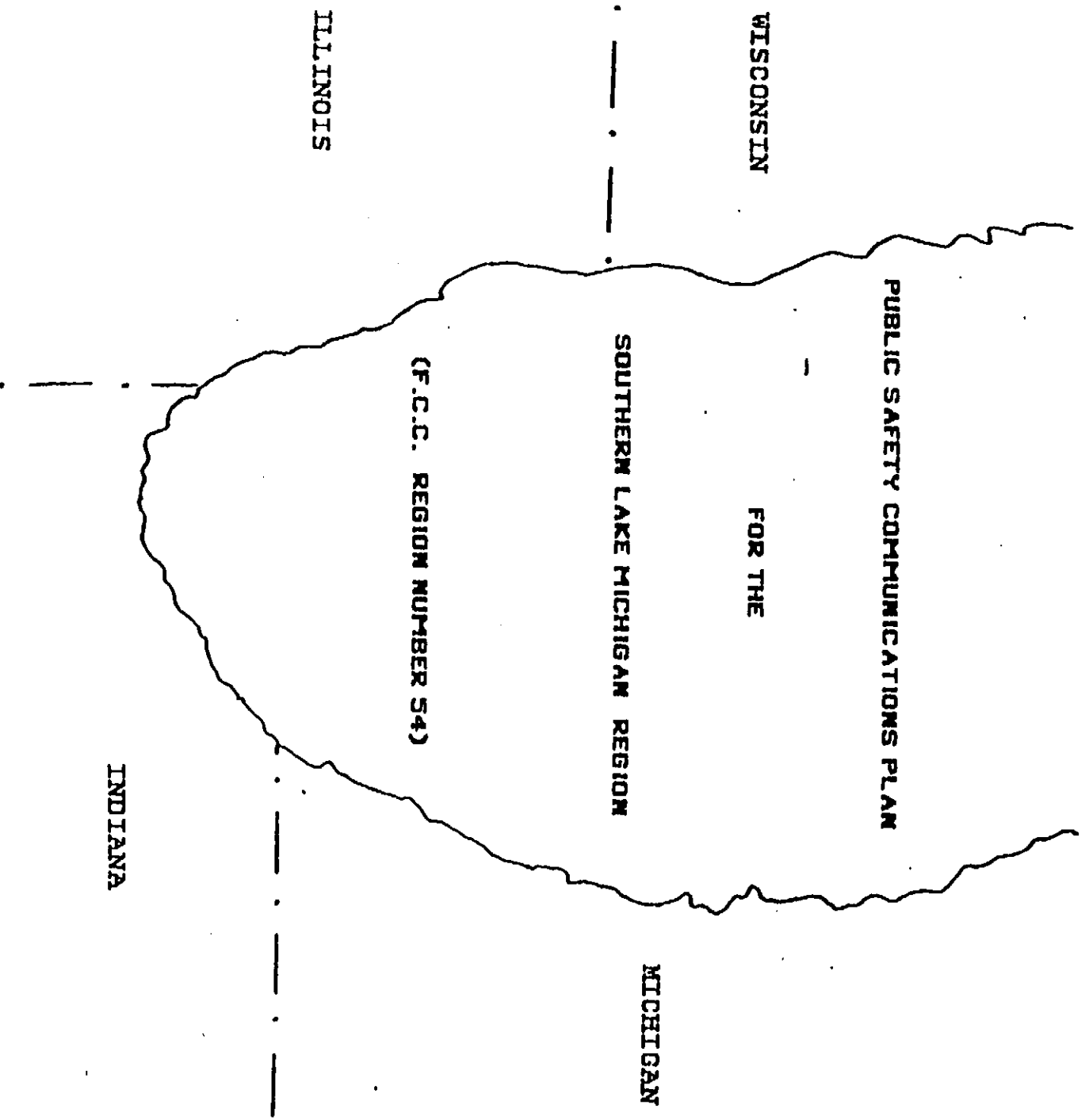


**SOUTHERN LAKE-MICHIGAN 800 MHz  
REGIONAL PLANNING COMMITTEE**



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## PREFACE

In December 1983, the United States Congress directed the Federal Communications Commission (FCC) to establish a plan to ensure that the communications needs of state and local public safety authorities would be met for the future. The Commission issued a Notice of Inquiry on March 7, 1984 and evaluated over three hundred comments from the public safety community and other interested parties.

These comments formed the basis for a Staff Report issued by the Commission's Private Radio Bureau on August 1, 1985. This report suggested various methods of meeting the communications needs of public safety. One option included was the allocation of additional frequencies at 821-825 MHz and 866-870 MHz.

The Commission issued an allocation order on September 19, 1986. Six Megahertz of spectrum were selected in the 821-824 MHz and 866-869 MHz bands, since they were adjacent to frequencies already being used for public safety purposes. However, while the Commission made this allocation, it also stipulated that the frequencies could not be used until a National Plan for spectrum utilization was adopted.

The Commission then established the National Public Safety Planning Advisory Committee (NPSPAC) in December, 1986. This committee had open membership and all interested parties were invited to participate in its meetings.

The Commission charged NPSPAC with the following tasks:

- (1.) Identify communications requirements of public safety agencies.
- (2.) Develop a scheme for efficient use of the new frequencies.
- (3.) Develop a scheme to increase the utility of existing public safety frequencies.
- (4.) Recommend the manner in which new technologies can be applied to public safety frequencies.
- (5.) Recommend guidelines to ensure compliance with the National Plan.

NPPSPAC submitted its Initial Report to the Commission in March, 1987. On May 15, 1987 the Commission issued a Notice of Proposed Rule making proposing policies and rules for the National Plan. NPPSPAC then issued its Final Report in September, 1987. On December 18, 1987 the Commission released a Report and Order regarding the development and implementation of a Public Safety National Plan: General Docket No. 87-112.

In its introductory comments the Commission expresses its belief that "while certain technical concerns must be addressed at the national level, the great diversity of needs in different areas of the country demand that input also be obtained at the State and Local levels." Thus, the United States was divided into Regions, primarily along State boundaries. A few large metropolitan areas were designated as independent Planning Regions.

Prior to the Report and Order, NPPSPAC's Final Report had recommended a total of fifty-four (54) Planning Regions. The Chicago and megalopolis was one of these. However, when the Report and Order was released, the Commission had established only forty-eight (48) Planning Regions. The multi-state Chicago megalopolis was specifically excluded from the list, as were other densely populated metropolitan areas around the country. A Petition for Limited Reconsideration was filed by NPPSPAC on February 12, 1988 asking that additional planning regions be established, as previously recommended. The Commission subsequently granted this Petition and established fifty-five regions, including the Chicago Metro area.

This document constitutes the Public Safety Communications Plan for Region No. 54: The Southern Lake Michigan Planning Region. It addresses the unique spectrum allocation requirements of the public safety and governmental authorities throughout this multi-state area. It is respectfully submitted to the Commission this ---- day of ----- under the umbrella of the National Plan.

Teddy F. Vratny, Chairman

# THE REGION

## ESTABLISHMENT OF REGIONAL BOUNDARIES

For Public Safety Communications purposes, the Southern Lake Michigan Region (the Region) is the geographic area surrounding the southern tip of Lake Michigan. The Region is comprised of forty-three counties within the four States of Wisconsin, Illinois, Indiana, and Michigan. Its approximately thirteen million people represents more than five percent of the Nation's population.

Protecting the lives and property of these persons is a function of hundreds of Public Safety and Special Emergency agencies which are operated or regulated by a multitude of various political jurisdictions. Personal mobility and the proximity of communities in today's metropolitan areas demand cooperation and coordination among these agencies. Whether the activity is search and rescue across Lake Michigan, or the pursuit of a criminal offender along the Tri-State Tollway, mobile and portable radios provide the means for the myriad of agencies involved to communicate with each other.

Radio communications also provide the means for each agency to accomplish its own individual, day-to-day operations. These communications must be reliable, and free from interference from neighboring agencies. Therefore, frequencies must be assigned to agencies throughout a given area in a manner that makes inter-agency communication possible, but prevents inter-agency interference.

Other issues to be considered when determining what area should comprise a Planning Region are: the continuing urbanization of outlying counties; the sophistication of radio technology; and most importantly, the amount of radio spectrum available to public safety agencies throughout the area.

Since agencies from around the southern tip of Lake Michigan affect each other more on these issues than they affect agencies in other parts of their own States, the decision to form a multi-state planning region was made.

The initial boundaries of the Southern Lake Michigan Region were determined by drawing a circle on a midwestern map, using downtown Chicago as the center and a 110 mile radius. Tangents were then drawn to this circle. The result was a densely populated area with a history of radio frequency problems covering 40,000 square miles. These boundaries were adopted as the starting point for definition of the Region on December 10, 1987.

Final boundaries for the Region, along county lines, were drawn in February, 1988 when the Petition was filed with the Commission. The forty-three counties which comprise the Southern Lake Michigan 800 MHz Planning Region are listed in Table 1, as shown in Figure 1.

#### PRELIMINARY ORGANIZATION

Monthly meetings for the planning process began in September of 1987. Deliberations on administrative and technical questions began at that time, using the Regional Planning Tasks published by NPSPAC as a functional basis for organizing small work groups. Much of the groundwork thus had already been done prior to the formal creation of the Region.

In March, 1988 four individuals were designated by the Associated Public-Safety Communications Officers, Inc. (APCO) as Co-Conveners for the Region: Teddy F. Vratny (Illinois); Donald Kottowski (Indiana); David Held (Michigan); and Carl Guse (Wisconsin). They then prepared and published an announcement of the first official meeting for persons interested in participating in the planning process.

#### NOTIFICATION OF ELIGIBLES

In General Docket No. 87-112, the FCC declared that since the Public Safety Radio Service and the Special Emergency Radio Service both play important roles in public safety, it is necessary to make both services eligible to operate in the 821-824/866-869 MHz bands.

COUNTY POPULATION ESTIMATES

	CURRENT <sup>1</sup>	1995 <sup>2</sup>	2005 <sup>2</sup>
<b>WISCONSIN</b>			
Kenosha	121,100	117,862	113,243
Racine	171,600	173,361	173,262
Milwaukee	937,500	890,453	844,791
Ozaukee	68,400	73,997	78,795
Washington	88,400	98,102	106,378
Waukesha	285,400	306,400	315,476
Dodge	75,900	80,078	81,504
Dane	341,400	360,961	377,383
Walworth	71,200	74,330	78,255
Rock	138,300	141,898	142,330
Jefferson	67,200	69,203	71,062
<b>ILLINOIS</b>			
Winnebago	250,800	250,345	246,472
Boone	29,100	30,017	30,690
McHenry	158,600	180,372	196,522
Lake	468,600	603,346	533,537
Cook	5,294,900	5,394,332	5,448,171
DuPage	716,200	828,757	884,683
Kane	299,000	344,672	379,274
De Kalb	73,600	73,111	75,073
Kendall	37,000	37,503	37,464
Willi	334,100	367,757	402,451
Grundy	31,200	32,187	32,616
Kankakee	98,600	94,705	92,471
<b>INDIANA</b>			
Lake	496,900	481,920	466,720
Porter	122,900	131,210	135,840
La Porte	106,500	101,970	97,610
Newton	14,100	13,880	13,440
Jasper	26,500	27,420	27,800
Pulaski	13,400	14,410	14,980
Starke	21,200	21,320	21,190
Marshall	41,300	43,110	44,530
St. Joseph	241,500	240,930	243,760
Eikhart	145,300	154,450	160,460
<b>MICHIGAN</b>			
Ottawa	167,100	190,900	216,000
Muskegon	156,900	153,600	148,600
Kent	467,200	496,700	523,200
Allegan	85,200	95,000	106,900
Van Buren	66,400	77,200	85,000
Berrien	162,700	168,200	166,600
Kalamazoo	214,100	218,800	219,100
Cass	48,300	52,600	55,600
Barry	46,800	52,600	58,000
St. Joseph	58,300	65,100	72,500
<b>TOTALS:</b>	<b>12,860,700</b>	<b>13,425,069</b>	<b>13,619,733</b>

1. U.S. Census Bureau, Current Population Reports, 1985  
 2. WI.: State of Wisconsin Demographic Services Center  
 IL.: State of Illinois, Bureau of the Budget  
 IN.: Indiana State Data Center  
 MI.: Michigan Dept. of Management and Budget

TABLE 1



While recognizing that it may not be possible to grant requests for assignments to everyone, the Commission did conclude that membership on regional planning committees must be open to representatives from all potential user groups.

In accordance with the Report & Order, the Southern Lake Michigan Planning Region took the below listed steps to ensure that its membership was open to as broad a range of eligible participants as possible. (Referenced materials are all contained in Appendix A).

1. On March 8, 1988 the announcement of the Initial Meeting was mailed to individual public safety agencies as well as professional organizations/associations of all eligible user groups, the National Communication System, and the Federal Emergency Management Agency.
2. On March 24, 1988 the FCC issued a Public Notice announcing the initial meeting.
3. On May 2, 1988 a reminder notice was sent out through the Law Enforcement Agency Data System (LEADS).
4. The Announcement was posted in County Courthouses throughout the Region from March through May, 1988.

#### FORMATION OF THE PLANNING COMMITTEE

On May 12, 1988 the first official meeting of the Southern Lake Michigan 800 MHz Regional Planning Committee (the Committee) was held in Arlington Heights, Illinois. Mr. Teddy F. Vratny was elected Chairman of the Committee; Lieutenant William T. Corbett was elected Secretary.

The Summary of Proceedings of this meeting (and of all meetings preceding and succeeding it) are available for inspection at the office of the Secretary.

Appendix B contains the names, affiliations, mailing addresses and phone numbers of the officers of the Region. Appendix C contains this information for all persons who have participated in the Southern Lake Michigan 800 MHz Regional Planning Committee.

#### REGIONAL CONFORMANCE REVIEW COMMITTEE (RCRC)

The Committee realizes that its work does not end with the submission of this Plan. Future modifications to the Plan may be required; applications for radio systems proposed within the Region will need to be reviewed for compatibility with the Plan; implementation of these systems will require monitoring; coordination with the National Plan will continue. Obviously, there must be a mechanism by which future tasks can be accomplished.

To provide this mechanism, the Committee of the Whole has established the Regional Conformance Review Committee (RCRC) (See Appendix D). This committee will be composed of the Frequency Advisory Committee Chairman and another representative from each State within the Region, plus the Regional Planning Committee Chairman. The RCRC will convene upon the Commission's approval of this Plan.

#### COORDINATION WITH ADJACENT REGIONS

There are four planning regions which are adjacent to the Southern Lake Michigan Region. They consist of the remaining portions of each of the four States. A combination of three historical facts has created an excellent opportunity for coordinating this Plan with those of the regions adjacent to it:

- (1) Among the five regions, the Southern Lake Michigan Region was the first to organize a planning committee.
- (2) From its beginnings in 1987, this Region has had as members, the Frequency Advisors and Regional Planning Conveners of each encompassing State.

(3) As of this date, two members of the SIMRPC have been elected Chairman of their home state's regional planning committees (Illinois and Indiana).

Communication among regions has thus been ever present during the drafting of this Plan. Implementation of each of the five plans will likewise be coordinated through the mutual membership and cooperation of the planning committees.

CONFORMITY WITH THE NATIONAL PLAN

It is the expressed intent of the Committee to conform with the requirements of the National Plan as defined in paragraphs 11 - 40 of General Docket No. 87-112. This Plan is submitted to the Commission subject to the review process described in the Report and Order.

REVIEW PRIOR TO SUBMISSION

As work progressed on the Regional Planning Tasks the original small groups were organized into three Subcommittees: Administrative, Technical, and Operational. They codified their suggestions, and wrote draft proposals on individual topics. After reaching a consensus, the subcommittees then presented their proposals to the Committee of the Whole for review and comment.

Upon acceptance of its content by the Committee, each draft was then forwarded to the Administrative subcommittee for collation. The complete final draft was then presented to the Committee of the Whole for page by page review.

AUTHORITY

The Southern Lake Michigan 800 MHz Regional Planning Committee derives its authority to carry out the activities required for composition and implementation of this Plan from the Commission's Report and Order General Docket No. 87-112 released on December 18, 1987 and the Petition for Limited Reconsideration as a multi-state region granted by the Commission on March 30, 1988.

## NEEDS ANALYSIS

The Report & Order specifies that regional plans explain how the requirements of all eligible entities were considered. This section of the Plan describes how this specification has been met.

### QUESTIONNAIRE DEVELOPMENT

It was decided that the best means of identifying the radio spectrum needs of the Region as a whole was to survey the potential users individually. To this end, work began on drafting a questionnaire in February, 1988. Sample documents were prepared and given to Committee members for comment during the ensuing three months. This review process resulted in the final survey instrument which is contained in Appendix E: The Southern Lake Michigan 800 MHz Regional Planning Committee Radio User Questionnaire.

Distribution to potential eligibles began in May, 1988. Over 1500 copies of the questionnaire were mailed to both individual public safety agencies and professional organizations/associations. Appendix F contains a listing of the professional organizations contacted. These organizations were requested to photocopy the survey and distribute it to their members. Because of this extended process the exact number of questionnaire recipients cannot be determined.

The questionnaire was designed to elicit meaningful information detailing current, as well as future, radio frequency needs. The years 1995 and 2005 were used for future projections. Information was requested in four topical sections:

- (I) "General Information" asked the respondents to provide agency identification information including the type of service supplied to the public.
- (II) "Demographic Information" asked specific questions regarding the agency's service area.

(III) "Frequency Needs" asked questions regarding the agency's use of radio frequencies for voice and data transmissions.

(IV) "Equipment" asked the respondents to project their agency's inventory of several radio equipment items.

#### QUESTIONNAIRE RESULTS

##### Section (I)

Four hundred and ninety-two (492) usable surveys were returned, compiled, and analyzed using the computer program DBASE III Plus. The objective of including both Public Safety and Special Emergency Service agencies was achieved. Surveys were received from all types of governmental and non-governmental organizations (i.e., Law Enforcement, Fire Fighting, Emergency Medical, Forestry, Veterinary, School Bus, etc.).

##### Section (II)

Eight agencies reported that their service area encompassed their entire state and five agencies reported that their service areas cross state lines. 389 of the agencies service an area that is urban, or both urban and rural. This statistic reflects the continuing urbanization of the outlying areas in the Southern Lake Michigan Region.

##### Section (III)

35.7% of the agencies reported that their radio system is not adequate for their needs today. This percentage increases to over two-thirds and more than three-fourths for the years of 1995 and 2005, respectively. One third of the respondents reported that their field units "often" have to wait for access to a voice channel. When asked if they planned to expand their use of radio frequencies for data transmission, 34.3% of the respondents said that they did.

Two other statistics found in this section of the questionnaire bear directly on issues raised in the Report and Order: prioritization of eligibles and frequency give-backs.

First, the total number of new 800 MHz frequencies reported to be needed now is 425; this total increases to 684 in 1995; by 2005, responding agencies expect to need over one thousand new 800 MHz frequencies in the Region. Secondly, given a choice between additional frequencies in the 800 MHz spectrum or additional frequencies in their current spectrum, 74.5% preferred the latter. The first statistic demonstrates the need for this Region to prioritize agencies applying for the new spectrum, according to their degree of involvement in providing for the protection of life and property. The second statistic supports the assumption that public safety entities in the Region are "waiting in line" for lower band frequencies. As licensees move up to the new spectrum they will be expected to make every effort to give up their lower band frequencies, as described in the Report and Order.

While the number of frequencies projected to be needed by the respondents appears to exceed the number available in the new spectrum, it should be noted that actual applications for them are few at this time. When asked if an application for 800 MHz channels was pending, only four (4) agencies responded affirmatively. Only one (Naperville, Illinois) has forwarded a frequency coordination request to the Committee. Prioritization is therefore expected to satisfy the needs of all public safety eligibles in the Region at this time of filing.

#### Section (IV)

This last section of the survey gathered figures relating to the amount of radio equipment in the Region. Mobile and portable radios constitute the largest portion of this equipment (approximately 67,000 owned now, over 100,000 units projected to be owned by 2005). The largest growth categories of equipment are mobile data terminals and automatic vehicle locators. These categories are projected to increase from 528 (MDT) now to 12,684 in 2005; and from 30 (AVL) now to 10,785 in 2005, respectively. The need to include data transmissions when planning spectrum allocations becomes obvious when confronted with these numbers.

For the sake of brevity, this section of the Plan has presented selected items of information as evidence to the Commission of the Planning Committee's efforts to identify the radio frequency needs of this Region's potential eligible users. More detailed results are contained in Appendix G. It is anticipated that the information collected with this questionnaire will prove as useful to future planning and coordinating activities within the Region as it has proven to be in the development of this Plan.

# APPLICATIONS

This section of the Plan describes the procedures for applying for a license to operate a radio system in the new spectrum, as well as the process by which that application will be evaluated. Applications shall be submitted during specific periods of time known as "filing windows". Said filing windows will be designated by the RCRC, be opened at least once annually, and be announced in advance. It is the intention of the RCRC to announce the dates of the first filing window within thirty (30) days of the date of the Commission's approval of this Plan.

## APPLICATION REVIEW

Applications for licenses in the 821-824/866-869 MHz band will be subject to review by the RCRC at the closing of each filing window. This review is required prior to formal submission of the application to the national APCO frequency coordination office. Applications may be rejected at the Regional level for non-conformance with this Plan. Also, any application received outside of the designated "filing window" will be returned to the applicant for re-submission during the next filing window.

## APPLICATION PROCEDURES

Applications will be submitted to the local Frequency Advisory Committee Chairman. The Frequency Advisory Committee Chairman will peruse the application packet for completeness, and the eligibility of the applying organization. Incomplete applications, or applications from agencies which are not considered by this Plan to be eligible for the limited spectrum, will be returned to the applicant with the appropriate remarks. Copies of complete applications received from eligible public safety entities will be forwarded to the RCRC for evaluation.

INFORMATION REQUIRED

The current standardized APCO Frequency Coordination and FCC License Application forms will be used. In addition, the applicant will be required to furnish supplemental information in specific categories. These categories are enumerated (and briefly defined) on the following page. Each category has been assigned a numerical weight for application evaluation purposes. Category weights are contained in Appendix H. Where further comments affecting a category are made elsewhere in this Plan, the appropriate page number(s) are also specified.

1. Service --- What tasks or duties the agency is charged with accomplishing.
2. System Type --- In narrative form, a description of the radio system being proposed (trunked, conventional, voice, data, voice/data combined, etc.) (page 14).
3. Intersystem Interoperability --- How agents of the applying organization will communicate with agents of different organizations. (pages 18, 21-25).
4. Channel Loading Factors --- Equipment inventory totals, and the maximum number of mobile radios potentially in use at a given time. (pages 16, 19).
5. Coverage Area --- Details of an engineering survey showing the radio coverage required for minimum coverage of jurisdictional boundaries. (pages 14, 15, 18).
6. Vacated Frequencies Returned --- Which frequencies the agency will release. (pages 16, 17).
7. Implementation Schedule --- An explanation of any budgetary commitment and a proposed time frame for putting equipment into service.

The RCRC may request additional information at the time of review to assist in evaluation.

#### APPLICATION EVALUATION

The Regional Conformance Review Committee (RCRC) will review each application for its conformity to this Plan. Evaluations will be based upon the seven factors mentioned above. A final point total will be determined by adding the points earned in each category as listed in Appendix H. The RCRC will base their recommendation for approval or rejection of the application upon the final point total.

Once an application has been reviewed it will be returned to the applicant for the appropriate action (e.g., filing, additional information required, modification, etc.).

#### ELIGIBILITY

Agencies applying for frequencies in the 821-824 and 866-869 MHz band will be prioritized according to the degree that the service(s) they provide is fundamental to the protection of life and property. Only Public Safety and Special Emergency Radio Service agencies are eligible to apply for a license in the 821-824/866-869 MHz band.

#### APPEAL PROCESS

Throughout the frequency allocation process, applicants are given opportunities to appeal decisions which have caused rejection of their application. The appeal process has two levels, APCO and the FCC. An applicant who decides to appeal a rejection should initiate that appeal immediately upon notification of the rejection. In the event that an appeal reaches the second level (the FCC), the Commission's decision will be final and binding upon all parties.

## SPECTRUM UTILIZATION

This portion of the Plan lays the foundation for the efficient and effective utilization of the spectrum. Its purpose is to guide the RCRC in the task of evaluating new applications for the use of radio frequencies in the 821-824/866-869 MHz bands.

### PRIMARY AND SECONDARY ZONES

The demand for frequencies varies depending on population of the area. Dense urban areas contain many individual public safety agencies, all making their own demands for frequencies. This problem is not as intense in more rural areas where the number of individual agencies is fewer. To differentiate between such areas of the Region, Primary and Secondary "zones" have been designated. A Primary zone contains jurisdictions which are severely impacted as a result of an excess demand for scarce spectrum. A Secondary zone contains jurisdictions which are impacted to a lesser degree. The requirements for system implementation in a Primary zone will be more restrictive than in a Secondary zone.

At this time the Primary zones are defined as the following six counties: Cook, DuPage, Lake, and Kane (Illinois); Lake (Indiana); Milwaukee (Wisconsin). The remaining 37 counties of the Region are all defined as Secondary zones.

### TRUNKING

Applicants requesting licenses for five (5) or more channels will be required to trunk those channels. Exceptions to the rule will not be allowed unless an equally spectrum efficient technology is proposed, or, the applicant can otherwise demonstrate that trunking will not meet the specific operational requirements of the agency.

Applicants requesting licenses for four (4) or less channels within the Secondary zone may be permitted conventional operation. In the Primary zone, conventional operations with four (4) or less channels will only be allowed when all efforts to consolidate communications with other agencies are proven to be infeasible.

#### COVERAGE AREA

The desired coverage of a system is considered to be a maximum of three (3) miles outside of the boundary of the applicant's jurisdiction. The maximum designed mean signal strength at this contour shall not exceed 40 dBu (+40dB above one microvolt per meter) measured with an antenna mounted no less than five feet (5') above ground. Petitions to provide coverage exceeding these parameters will be examined on a case by case basis. Overlap or extended coverage must be minimized even where agencies are proposing to intermix systems for cooperative and/or mutual aid purposes.

#### ADJACENT CHANNEL ASSIGNMENTS

Adjacent channel assignments will be made when it is determined that the two or more systems will create a signal strength of +25dBu or less, anywhere within their partners' boundary.

#### CO-CHANNEL ASSIGNMENTS

Co-channel assignments will be made when it is determined that the two or more systems will create a signal strength of +5dBu or less, anywhere within their co-channel partners' boundary.

To achieve the most efficient use of the spectrum, distances between transmitters for co-channel reuse will not be held to a seventy (70) mile separation in this Plan. Separation of co-channel transmitters will be determined by the coverage needs of the applicant, natural barriers for separation, antennae patterning, and limited ERP's where possible.

#### CHANNEL LOADING CRITERIA

In this Plan, existing loading standards will be applied for Priority Level I voice communications: 70 mobiles per conventional channel, 100 mobiles per trunked channel. For all data only systems and Priority Level II and III voice (or voice/data combined) systems, the loading criteria will increase: 100 mobiles per conventional channel, and 150 mobiles per trunked channel.

Agencies that support interoperability by permitting Federal use of their frequencies through S-160 (or equivalent) agreements, may augment their channel requirements by a maximum of 2% to account for the increased number of mobile units. Written documentation detailing the expected number of Federal radios involved will be required at the time of application.

In order to conserve spectrum, agencies must demonstrate that the number of radios potentially in use at one time meet these loading criteria. Agencies which cannot demonstrate this potential may be denied exclusive use of the allocated channel(s). Petitions to deviate from these criteria will be considered by the RCRC on an individual basis.

#### VACATED FREQUENCIES

It is anticipated that as public safety agencies implement 800MHz radio systems, they will be able to vacate the VHF and UHF frequencies on which they previously operated. The RCRC will apply the three conditions governing frequency give-backs described in the Report and Order:

- (1) The new system fully replaces the functions of the old one.
- (2) The licensee has no other communications requirements that could be met through the use of the lower frequencies.
- (3) The new system has operated satisfactorily for long enough to allow a smooth transition from former operations, and to demonstrate its reliability.

Vacated frequencies will be returned to their respective pools to be re-assigned by the FCC approved Frequency Advisory Committee Chairman, with recommendations by the RCRC, in order to provide the most beneficial use to public safety.

#### INITIAL SPECTRUM ALLOCATION

The methodology used to determine the spectrum allocations at the time of filling this Plan is contained in Appendix J. The allocation itself is contained in Appendix K.

# TECHNICAL DESIGN CONSIDERATIONS

This section of the Plan discusses topics which must be considered when engineering a new system.

## CHANNELING PLAN

The 25 KHz offset channeling plan established by the National Plan will be required of all systems to be licensed in the 821-824/866-869 MHz bands.

## INTEROPERABILITY WITH ADJACENT LOWER BANDS

There are several hundred agencies in the Region currently operating on frequencies in the 806-821/851-866 MHz bands. While most of these agencies may continue operating in these frequencies for several years, many of them will be looking to expand their systems into the new spectrum. Any application submitted under the auspices of this Plan must demonstrate technical ability to provide communication between new and existing systems. Waivers for technical specifications on existing 800 MHz equipment will be considered on an individual basis.

## SYSTEM DESIGN

When designing a system, engineers will be required to minimize the distance between transmitter sites by using a combination of limited Effective Radiated Power (ERP), tower height, type of terrain, or any other factors which are technically feasible to minimize adjacent and co-channel interference. Information detailing the methodologies used (including calculations) must be included in the application.

#### DATA TRANSMISSION

The SIMRPC user survey revealed the use of radio frequencies for data transmissions as the largest "growth" category among responding agencies in the Region. As stated in the Loading Criteria section of this Plan, data only transmissions, whether for emergency or routine messages, will demand a higher loading standard.

#### CELLULAR RADIO TECHNOLOGY

Trunking technology is presently considered the most spectrum efficient use of radio transmissions for public safety. Cellular radio technology has so far proven useful only for telephone communications. However, it may, with future technological improvements, prove useful for public safety. Agencies are cautioned that any proposal of the use of cellular radio as an alternative to a trunked radio system must demonstrate that it can provide the same or greater degree of spectrum efficiency as trunking, and handle communications in an emergency situation.

#### MOBILE SATELLITE SERVICE (MSS)

During incidents of major proportions such as airliner crashes, earthquakes, tornadoes, floods, forest fires or nuclear reactor calamities, public safety requirements might include the need for long-range communications in and out of a disaster area. The planned Mobile Satellite Service (MSS) may prove to be a viable alternative to land based systems in these situations, once technical innovations are developed which will provide uni-directed or corridor-driven communications over a lengthy distance. This service should be restricted to frequencies above 960 MHz, however, and licensing in the Public Safety spectrum shall be limited to public safety eligibles only.

AIRCRAFT TO GROUND COMMUNICATIONS

The use of any 800 MHz radio in an aircraft shall be restricted. Air to ground transmissions shall be limited to a maximum effective radiated power (ERP) of one (1) Watt\* unless system design dictates. Otherwise, tactical transmissions shall be on the mobile relay output or talk-around frequencies only. Co-channel and adjacent channel users are not required to provide protection to airborne users. No transmissions on limited area channels are allowed above 2,000 feet AGL, and no transmissions are allowed above 5,000 feet AGL, even on wide area mutual aid channels.

\* Aircraft will be permitted to utilize additional power under 500 feet AGL.

## INTEROPERABILITY CONSIDERATIONS

This section of the Plan outlines the steps taken by the Committee to permit Federal, State and Local agencies to coordinate their activities during an emergency or disaster situation.

### INTERSYSTEM INTEROPERABILITY

The intent of this Plan is to enhance interagency communication. Extensive mutual aid communication networks already exist throughout the Region. The National Plan has now set aside five (5) channels in the new spectrum for mutual aid. Agencies applying for licenses in the 821-824 and 866-869 MHz bands will be required to explain how they will implement the new Common Channels. They will also be required to explain how they will maintain intercommunication with their neighboring agencies who do not implement the Common Channels, but still are dependent upon the applying agency for assistance in an emergency.

### COMMON CHANNELS

The Common Channels used in this Region comply with the National Plan, and consist of one (1) calling channel and four (4) tactical channels (Tac 1 through Tac 4). (See Table 2).

SOUTHERN LAKE MICHIGAN 800 MHz PLANNING REGION  
COMMON CHANNEL FREQUENCY DESIGNATIONS

<u>USAGE</u>	<u>FREQUENCY</u>
Calling Channel	821.0125 MHz *
	866.0125 MHz **
Tactical Channel 1	821.5125 MHz *
	866.5125 MHz **
Tactical Channel 2	822.0125 MHz *
	867.0125 MHz **
Tactical Channel 3	822.5125 MHz *
	867.5125 MHz **
Tactical Channel 4	823.0125 MHz *
	868,0125 MHz **

\* - MOBILE  
 \*\* - BASE

TABLE 2

Communications on Common Channels use a two-tier structure: initial contact (calling), and working (tactical) channels. These channels are not to be used for daily operations, nor for inter-agency communications that do not involve an emergency situation. The Tactical Channels shall cover the entire Regional area, with mobile relay stations normally operating in the "repeat disable" mode.

The Common Channels are restricted to required intercommunications among agencies that do not have access to other compatible communications channels. A "Primary Dispatch Center" will assign one or more tactical channels for the duration of a specific emergency or incident requiring multi-agency communications.

Because of the wide variance of voice codes among agencies ("ten" signals, alpha-numeric codes, etc.), agencies will use plain English on the Common Channels. The Primary Dispatch Center, with full support of the Regional Committee, will monitor radio traffic discipline, and resolve serious or chronic infractions.

#### PRIMARY DISPATCH CENTER

The four (4) State governments of the Region will be responsible for the implementation and operation of the National Calling Channel, Tactical Channels, and Primary Dispatch Centers. They will ensure that interoperable tactical channel mobile relays exist in specific areas of the Region. The mobile relay stations will provide the required number of working channels within the Region necessary to assure interoperable communications between Federal, State and Local Government agencies involved in an emergency. Other services shall participate as required, to ensure the public safety.

Agencies involved in an incident will be subject to the Regional rules on inter-agency communication. Radio transmissions will be made in accordance with the directions of the Primary Dispatch Center or controlling agency.

#### CALLING CHANNEL

Calling Channel base stations will be configured as mobile relays, strategically located to assure complete regional coverage, and connected by a suitable network to Primary Dispatch Centers. Mobile "talk around" is permitted on the Calling Channel to establish initial contact between agencies, for the purpose of determining which Tactical Channel(s) to use for the duration of an incident.

Depending on geographical size and population density, several networks may be necessary to cover the outer areas of the Region. Primary Dispatch Centers, and agencies operating base/control stations in the area shall monitor the Calling Channel to provide assistance and/or assign a Tactical Channel to requesting field units.

The Calling Channel shall be used only to make initial contact with other agencies in the Region, or with the Primary Dispatch Center in that section of the Region. After contact is established, a tactical or other mutual aid channel shall be expeditiously agreed upon, or be assigned by the Primary Dispatch Center. The Calling Channel shall not be used as a working channel for continued communications. It shall be vacated as soon as possible, to free it up for the next initial contact.

#### TACTICAL CHANNELS (TAC 1 THROUGH TAC 4)

Tactical Channels are reserved for agencies involved in multi-agency communications during emergencies or other occurrences requiring interoperable communications. Tactical channels, like the Calling Channel, will be strategically located to provide maximum coverage throughout the Region. Design criteria will limit Tac Channel coverage to permit multiple re-use of the channels within the Region as required in coordination with adjacent regions to prevent or minimize interference.

Tac Channel coverage design shall ensure that at least one channel is available for each section of the Region. Multi-agency communications events will be coordinated by the Primary Dispatch Center, or assigned to the controlling agency. The coordinating agency shall relinquish control of the channels when the incident is cleared.

#### CROSS SYSTEM PATCHES

Cross system patches to existing day to day systems, other mutual aid channels, or long range communications systems must be manually controlled. Automatic patches are not permitted. Cross system patches are normally handled by the Primary Dispatch Center in the section of the Region involved.